

200-, 206-, 209-, AND 211-TYPE SELECTORS AND 10-, 26-, AND 32-TYPE BANKS REQUIREMENTS AND ADJUSTING PROCEDURES

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NOTICE

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1. GENERAL

1.01 This section covers 200-, 206-, 209-, and 211-type selectors and 10-, 26-, and 32-type banks.

1.02 This section is reissued to:

- Rearrange the contents of Parts 2 and 3, and add a Part 4.
- Modify procedure 2.12 for checking overthrow stop position
- Modify procedure 2.15 for checking armature airgap.

Since this is a general revision, revision arrows have been omitted. This reissue does not affect the Equipment Test List.

1.03 Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.

1.04 **Asterisk (*):** Requirements are marked with an asterisk when to check for them would necessitate the dismantling or dismounting of apparatus or would affect the adjustment involved on other adjustments. No check need be made for these requirements unless the apparatus or part is made accessible for other reasons or its performance indicates that such a check is advisable.

1.05 **Preparation of KS-16832, L2, Lubricant:** This lubricant is provided in 2-ounce and 1-pint containers. A small wide-mouth container, such as the 2-ounce jar in which the lubricant is available, should be used as a receptacle from which to dispense the lubricant. If allowed to stand more than 1 day without agitation, the lubricant ingredients tend to separate; therefore,

before each day's use, shake the container of lubricant for approximately 30 seconds to ensure mixing of the ingredients. The proper method of shaking the lubricant consists of repeated, rapid turning of the container to an upside down position and back to the upright position. If lubricant is to be used from a 1-pint container, the lubricant must be mixed as just described before it is poured into the smaller container. Under storage conditions, the cover should be tight on the container.

1.06 **One dip of KS-16832, L2, Lubricant,** for the purpose of this section, is the amount of lubricant retained on the KS-14164 brush after being dipped into the lubricant to a depth of approximately 3/8 inch and scraped once against the side of the container as the brush is removed.

1.07 **Make-Busy Information:** Before making any of the inspections or readjustments specified herein, ascertain whether or not it is necessary to make any of the circuits busy. Circuits which are so affected should be made busy in the approved manner, and the necessary relays should be held operated or nonoperated to isolate the selector circuit.

1.08 **Method of Connecting Selectors for Electrical Tests:** For the methods of connecting the test set to the selector in checking and readjusting to meet the electrical requirements specified herein, refer to Sections 026-706-711 and 026-706-712.

1.09 **Steady and Uniform Operation:** A selector operates steadily and uniformly when it operates regularly under self-interruptions for not less than ten revolutions. If the selector is wired so it cannot be rotated under self-interruptions, it shall be rotated under control of the relay wired to its interrupter contacts for at least ten revolutions. A slight hesitation or momentary change of speed at or about the time the rotor brushes engage the feeder brushes is not objectionable if it recurs regularly. A distinctive click indicating the failure of the pawl to latch up over a tooth shall not be present. It is satisfactory to rotate the selector for approximately 1 minute and to judge its operation by ten consecutive revolutions thereafter.

1.10 **Selector Circuit:** The selector circuit referred to herein ordinarily consists of the selector magnet coil. However, when apparatus such as a lamp, resistance, or relay, or any

combinations thereof is wired into the circuit to be in series with the selector coil during normal circuit operation, it shall be considered part of the selector circuit. For requirements 2.36 (Speed), 2.32 (High-Voltage Interrupter Contact Test), and 2.33 (Low-Voltage Interrupter Contact Test), the selector circuit shall be extended to include the interrupter contacts with spark protection.

1.11 High or low voltage refers to the potential drop or closed circuit voltage across the selector circuit with the test set connected to the interrupter spring which is wired to the magnet coil. The specified potential drop must be regulated as far as possible by the use of the auxiliary battery used with the selector test set. A series resistance may be used to obtain the correct potential, when necessary, but this resistance must always be less than that which would be sufficient to correct for a difference of one cell.

1.12 Numbering of Rotor Brushes: The rotor brush pairs are numbered from left to right, facing the front of the selector, beginning with the No. 1 pair which is the nearest to the ratchet wheel.

1.13 Numbering of Interrupter Contact Springs: The interrupter contact springs are numbered consecutively, starting at the interrupter spring nearest the spring stop which is spring No. 1.

1.14 Bank feeder brushes are those feeder brushes which are part of the 10-, 26-, or 32-type bank.

1.15 Detachable feeder brushes are those feeder brushes which are mounted as a detachable unit by a stud used in place of the top selector mounting screw.

1.16 The standard point of measurement (Fig. 1) is a point on the driving arm beneath the pawl spring to which the driving pawl is fastened.

1.17 Selectors which do not meet the test requirements for 2.19 (Step Test), 2.36 (Speed), 2.32 (High-Voltage Interrupter Contact Test), or 2.33 (Low-Voltage Interrupter Contact Test) shall be exercised for approximately 1 minute and then, if necessary, they shall be cleaned and relubricated and then retested for these requirements.

1.18 Position of Selector When Requirements Are Met: Unless otherwise specified, all requirements shall be met with the parts in the position which they assume after being operated electrically.

1.19 All rotor brush requirements shall be met on both ends of the rotor brush assembly.

1.20 "Running" and "Stepping": In the circuit requirements table, test clip data is given to indicate the method of connecting the test set to the selector in checking and readjusting to meet the requirements specified herein. "For Running" (previously "Requirements for Running") and "For Stepping" (previously "Requirements for Stepping") appear in the "Remarks" column and are associated with the test clip data. The data "For Running" is for use in cleaning and lubricating the selector and for checking requirements 2.36 (Speed), 2.32 (High-Voltage Interrupter Contact Test), and 2.33 (Low-Voltage Interrupter Contact Test) on those selectors where these requirements apply or wherever it is necessary to rotate the selector under self-interruptions or under control of the relay wired to its interrupter contacts. The data "For Stepping" is for use in cleaning and lubricating in case the selector is not wired for operation on self-interruptions and in checking requirements 2.15 (Armature Airgap), 2.18 (Magnet Pull Test), 2.19 (Step Test), or wherever it is necessary to operate the selector step by step.

1.21 Use of Portable Lamp and Dental Mirror: The 510C portable lamp and 376A dental mirror may be used in connection with the visual inspections specified in Part 2, Requirements. In using the 510C portable lamp, make sure the proper cord is used for the available voltage.

1.22 Moving Rotor Brushes by Hand: In all cases where it is necessary to move the rotor brushes by hand, do this by manually holding the armature against the core and grasping the free ends of the rotor brushes between the contact portion and the hub.

1.23 To step the selector manually, apply sufficient pressure to the bottom of the armature, as shown in Fig. 2, to force it upward against the core and then release the armature. In some cases it may be necessary to apply the force with a snap in order to obtain a slight whip

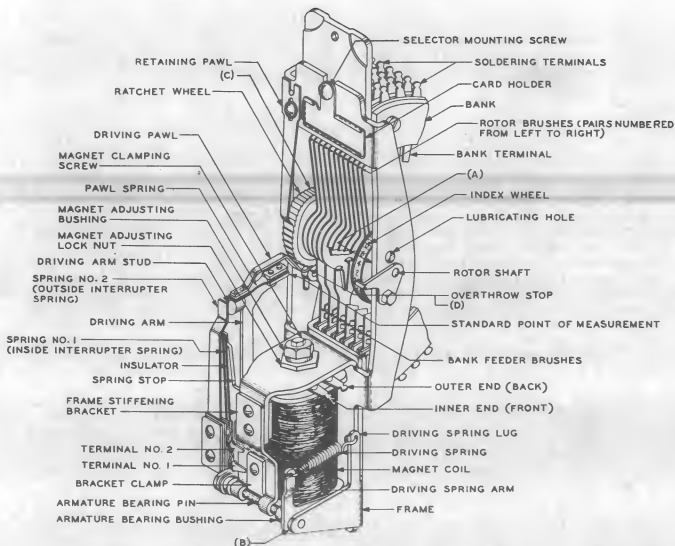


Fig. 1—206-Type Selector and 26-Type Bank

of the driving arm so the driving pawl will engage a tooth of the ratchet wheel. Where, because of limited space, the armature cannot be operated in this manner, it is permissible to step the selector by operating and releasing the driving arm taking care to grasp the driving arm. To do this, brace

the left thumb on the screws of the interrupter spring pileup and pull the driving arm with the fingers of the left hand. Take care to position the fingers on the lower half of the driving arm to avoid overstressing the arm.

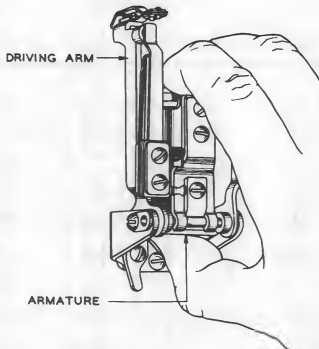


Fig. 2—Method of Stepping a Selector Manually

2. REQUIREMENTS

2.01 Cleaning

- (a) The ratchet wheel and armature bearings and the surfaces of the magnet core and armature adjacent to each other shall be cleaned, when necessary, in accordance with approved procedures.
- (b) The interrupter contacts shall be cleaned, when necessary, in accordance with Section 069-306-801.

2.02 Treatment of Banks and Rotors:

Bank terminals and rotors shall be treated in accordance with Section 069-330-801.

Before Turnover

- (a) **Bank terminals** (32-type bank associated with 211-type selectors) shall be treated with No. 30 oiled sleeving.

- (b) **Rotors** (211-type selectors) shall be treated with No. 33 oiled sleeving.

After Turnover

- (c) **Bank terminals** (200-, 206-, and 209-type selectors) shall be initially cleaned with No. 29 aloxite sleeving followed by treating with No. 30 oiled sleeving. Subsequently, the bank terminals shall be treated with No. 30 oiled sleeving.
- (d) **Bank terminals** (211-type selectors) shall be treated with No. 30 oiled sleeving.
- (e) **Rotors** (200-, 206-, and 209-type selectors) shall be cleaned using No. 32 aloxite sleeving, followed by treating with No. 33 oiled sleeving.
- (f) **Rotors** (211-type selectors) shall be treated with No. 33 oiled sleeving.

(g) Recommended Interval for Treatment of Bank Terminals and Rotors:

Ordinarily bank terminals and rotors should not require treatment more frequently than at yearly intervals. For 200-, 206-, and 209-type selectors and associated banks, this interval may be extended if local conditions are such as to ensure that the parts are satisfactory during the extended interval. On 211-type selectors and associated banks, the interval shall not exceed one year. Immediately after such treatment, the bank terminals equipped with precious metal shall be inspected for wear. Where evidence of wear of the precious metal in the brush track is present, future treatments shall be made at 6-month intervals instead of 1 year.

2.03 Lubrication (Selectors Only): The 200-, 206-, 209-, and 211-type selectors shall be lubricated with KS-16832, L2, lubricant as follows.

- (a) **Before turnover**, the installer shall lubricate parts of the selector in accordance with Table A if more than 6 months has elapsed between the date of manufacture (as indicated by the date stamped on the selector frame in front of the magnet adjusting bushing locknut).
- (b) **After turnover**, the selectors shall be lubricated as specified in Table A at 3-year intervals except for those selectors subjected to

high-temperature conditions such as may prevail near hot air ducts, radiators, etc. Selectors so situated shall be lubricated at 2-year intervals. However, the 2- and 3-year intervals may be extended if periodic inspections have indicated that local conditions are such as to ensure that the selectors will be adequately lubricated during the extended interval.

TABLE A
LUBRICATION

PART	AMOUNT
Right Rotor Bearing Fig. 1 (A)	1 dip at end of rotor
Left Rotor Bearing	1 dip at end of rotor
Right Armature Bearing Fig. 1 (B)	1 dip, distributed between both sides of the bearing
Left Armature Bearing	1 dip, distributed between both sides of the bearing
Ratchet Wheel (Fig. 1 (C))	4 dips, distributed over the teeth of the ratchet wheel while the selector is being rotated
Overthrow Stop Fig. 1 (D)	1 dip, applied between the overthrow stop and the driving pawl while the selector is held operated

2.04 Record of Lubrication: During the period of installation, a record shall be kept by date of the lubrication of the selector; and this record shall be turned over to the telephone company with the equipment. If no lubrication has been done, the record shall so state.

2.05 Alignment of Tips of Rotor Brushes

(a) **Fig. 3(A)**—The trailing edges or tips of all nonbridging brush members shall be in approximate (± 0.010 inch) alignment. The reference line used as a basis for this measurement shall be parallel to the axis of the rotor shaft.

Gauge by eye.

(b) **Fig. 3(B)**—The tips of the bridging brushes shall overlap the line of contact of the nonbridging brushes by 0.025 inch ± 0.015 inch.

Gauge by eye.

(The rotor brush members are 0.013 inch thick.)

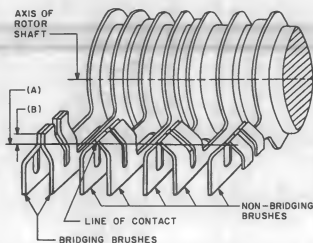


Fig. 3—Alignment of Tips of Rotor Brushes

2.06 Clearance Between No. 1 Rotor Brush and Driving Arm: The clearance between the No. 1 brush and the driving arm with the rotor brush assembly in the position it assumes after being operated electrically and with the sideplay of the armature taken up toward the right as viewed from the front shall be

Min 0.015 inch

Note: The rotor brush members are 0.013 inch thick.

To check this requirement proceed as follows:

- (1) Operate the selector electrically until the No. 1 rotor brush is adjacent to the top edge of the driving arm.
- (2) Take up the sideplay of the armature to the right as viewed from the front.
- (3) Observe the clearance of the No. 1 rotor brush and the top edge of the driving arm.

- (4) Check the requirement on both halves of the rotor brush assembly.

2.07 Armature Bearing Pin Position (Armature Bearing Pin Without Clamp Plate):

The armature bearing pin shall be approximately centered with respect to the sides of the frame and securely held in position by the frame stiffening bracket and bracket clamp.

- 2.08 Armature Endplay:** The armature shall have an endplay on its shaft of

Min 0.005 inch

Gauge by eye and feel.

To check this requirement, move the armature from one side to the other and observe the clearance between the armature bearing brushings and the lugs of the frame.

2.09 Clearance Between Rear Corners of Armature and Lugs of the Frame:

Fig. 4(D)—The clearance between the rear corners of the armature and the lugs of the frame shall be

Test—Min 0.003 inch

Readjust—Min 0.005 inch

Use the 74D gauge.

To check this requirement, move the armature toward one lug as far as possible and insert the 74D gauge in the gap between the armature and this lug to measure the clearance at the rear corner. Using the 376A dental mirror, observe the clearance. Move the armature toward the other lug, and recheck at that lug.

2.10 Armature Backstop Position: Fig. 4

(A)—At the time of turnover, the armature backstop shall be positioned on the selector so the straight portion of the stop designated (B) in Fig. 4 inclines upward to the right.

Gauge by eye.

2.11 Position of Rotor Brushes on Bank Terminals

- (a) **Bridging Brushes:** Fig. 5(A)—With the armature against the backstop, the retaining pawl disengaged, and the play of the rotor assembly taken up alternately in the backward and forward directions, bridging brushes shall not touch adjacent terminals. See (c).

Gauge by eye.

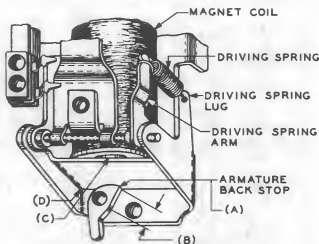


Fig. 4—Armature Backstop Position

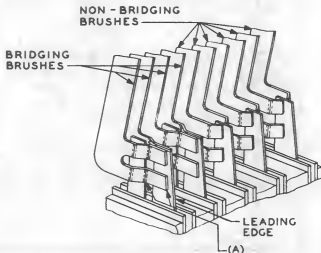


Fig. 5—Position of Bridging Brushes on Terminals

- (b) **Nonbridging Brushes:** Fig. 6(A)

Test—With the armature against the backstop, the retaining pawl disengaged, and the play of the rotor assembly taken up alternately in

the backward and forward directions, the tips (trailing edges) of nonbridging brushes shall be

Min 1/64 inch

from the respective edges of the bank terminals. See (c).

Gauge by eye.

Readjust—With the armature against the backstop, the retaining pawl disengaged, and the rotor assembly rotated in a backward direction to take up the play between the driving pawl and any ratchet wheel tooth, the tips (trailing edges) of all nonbridging brushes shall be

1/32 inch

from the leading edges of their respective bank terminals. See (c).

Gauge by eye.

The bank terminals are approximately 1/64 inch thick.

This requirement shall be checked on all nonbridging brushes when the brushes are on the bottom terminals and also on the pair of nonbridging brushes nearest the index wheel when these brushes are at the middle and uppermost positions of the bank.

(c) In checking, apply pressure against the driving spring arm where the driving spring is attached to ensure that the armature is against the backstop.

2.12 Overthrow Stop Position: Fig. 7

(A)—With the armature against the backstop [see requirement 2.11(c)] and the rotor assembly rotated in a backward direction to take up the play between the driving pawl and any ratchet tooth:

(a) The driving pawl shall not bind between the ratchet wheel and the overthrow stop. This requirement shall be checked at four positions of the ratchet wheel with the rotor brushes in a vertical position and a horizontal position in each half cycle of the rotor.

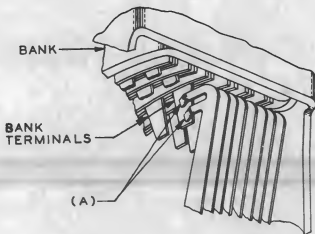


Fig. 6—Retaining Pawl Position and Tension

Gauge by eye and proceed as follows.

- (1) Operate the selector (step by step) to the required positions.
- (2) Take up the play between the driving pawl and any ratchet tooth by moving the rotor in a backward direction and then releasing the rotor.
- (3) Grasp the upper end of the driving arm between the thumb and forefinger.
- (4) Move the driving arm gently from side to side. Binding will be indicated if the driving pawl does not return to approximately its original position.
- (b) The clearance between the driving pawl and the overthrow stop shall be such that the motion of the rotor brush assembly at the brush tips is maximum 1/32 inch.

Gauge by eye and proceed as follows.

- (1) Disengage the retaining pawl.
- (2) Operate the armature manually and slowly release it against the backstop. See requirement 2.11(c). Rotate the rotor brush assembly in the direction of rotation and note the motion of the brush assembly at the brush tips.

- (3) Repeat this check with the opposite ends of the brushes contacting the bank terminals.

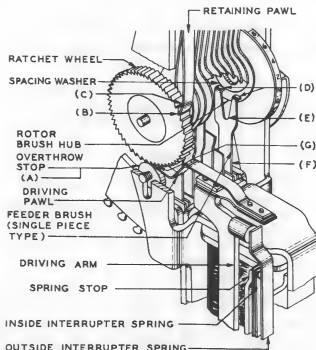


Fig. 7—Ratchet Wheel and Associated Parts (206- and 211-Type Selectors Illustrated)

2.13 Retaining Pawl Position and Tension

- (a) *Fig. 7(B)*—The retaining pawl shall just drop over the radial face of the ratchet wheel teeth when the armature is operated manually and slowly released against the backstop. See requirement 2.11(c).

Gauge by eye.

This requirement shall be checked in at least four positions of the ratchet wheel approximately 90 degrees apart.

- (b) *Fig. 7(C)*—The tension of the retaining pawl against the ratchet wheel teeth measured at the bend in the pawl shall be

Test—Min 40 grams, max 80 grams

Readjust—Min 50 grams, max 70 grams

Use the 79C gauge.

The application of the gauge may be facilitated by using a small loop of twine looped around the pawl and the end of the gauge.

- 2.14 Driving Spring Tension:** Fig. 8(A) and 9(A)—The driving spring tension, measured at the standard point of measurement as the driving pawl drops over a ratchet wheel tooth, shall be within limits specified in the charts furnished with the section.

Note: Fig. 8(B) and 9(B)—The outside interrupter spring shall not be in contact with the driving arm stud when the above requirement is met.

Use the 79B gauge, and proceed as follow.

- (1) Place the toothpick between the interrupter springs just below the contact point to force the outside interrupter spring away from possible contact with the driving arm stud when the armature is fully operated.
- (2) Apply the 79B gauge to the standard point of measurement, and hold the gauge horizontally.
- (3) Measure the tension at the instant the driving pawl drops over the next tooth of the ratchet wheel.
- (4) It is advisable to check the measurement two or three times because of the possibility of the gauge twisting at the point where it is attached to the driving arm.

2.15 Armature Airgap: Fig. 4(C)

200-, 206-, and 211-Type Selectors

- (a) With the magnet electrically operated on low voltage, the gap between the armature and the backstop shall not exceed 0.030 inch.

Use the 92J gauge.

- (b) With the magnet electrically operated on low voltage and the overthrow or whip removed, the airgap between the armature and magnet core shall be such that the driving pawl will engage all ratchet wheel teeth throughout a complete revolution. This requirement shall be checked in all positions of rotation.

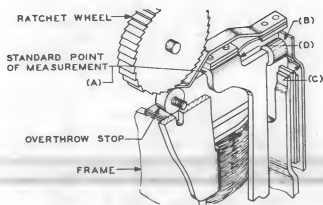


Fig. 8—Driving Pawl and Associated Parts (200-, 206-, and 211-Type Selectors)

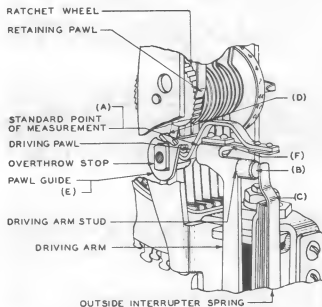


Fig. 9—Driving Pawl and Associated Parts (209-Type Selector)

Gauge by eye, and remove the overthrow or whip as follows.

- (1) Apply sufficient pressure against the back of driving pawl to prevent the armature from operating when the magnet is electrically energized.
- (2) Remove the finger pressure gradually, permitting the armature to operate slowly,

thereby eliminating overthrow or whip of the armature arm.

- (3) The requirement is met if the selector steps when the finger pressure has been removed and the magnet de-energized.

209-Type Selectors

- (c) The airgap between the armature and core shall be such that the driving pawl will engage any tooth of the ratchet wheel when a 0.010-inch gauge is placed between the armature and the magnet core and the selector is electrically energized on low voltage. This requirement shall be checked in all positions of rotation.

Use the KS-6909 gauge, and eliminate the overthrow or whip as described in (a).

2.16 Driving Pawl Tension and Position:

Driving Pawl Tension

- (a) The tension of the driving pawl against the ratchet wheel or pawl guide, measured at the bend near the ratchet wheel end of the pawl with the armature in the electrically operated position, shall be

Test—Min 90 grams, max 150 grams

Readjust—Min 100 grams, max 140 grams

Use the 70J gauge applied at the right-hand side of the pawl.

Driving Pawl Position

- (b) The sides of the driving pawl along its length shall be parallel with the sides of the ratchet wheel.

Gauge by eye.

- (c) **Fig. 9(D)**—The driving edge of the pawl shall be parallel to the axis of the rotor brush assembly.

Gauge by eye.

Check this requirement by observing the motion of the pawl as it is clamped between the ratchet wheel tooth and the overthrow stop by intermittently forcing the rotor brush assembly in the direction

of rotation and noting whether or not there is a twisting motion of the pawl.

- (d) **Fig. 7(G)**—The tip end of the driving pawl shall in no case extend beyond either edge of the ratchet wheel.

To check this requirement, operate the selector electrically for a complete revolution and then check at four positions approximately 90 degrees apart after stepping the selector electrically to these positions.

2.17 Pawl Guide Position, 209-Type Selectors: Fig. 9(E)

- (a) With the rotor brush assembly rotated forward to take up all rotary play, the following conditions shall be met.

- (1) The driving pawl shall advance the rotor assembly only one step with each operation of the armature.
- (2) As the armature is slowly released manually from its operated position, the tip of the driving pawl shall clear the top of the tooth adjacent to the tooth which the pawl is about to engage.

Gauge by eye.

- (b) With the rotor brush assembly rotated backward to take up all rotary play, the following condition shall be met.

- (1) As the armature is slowly released manually from its operated position before the tip of the pawl strikes the radial face of the tooth to be engaged, it shall contact the front slope of the adjacent tooth.

Gauge by eye.

2.18 Magnet Pull Test: Fig. 8(D) and 9(F)—When the low voltage specified in the

charts furnished with the section is applied, the selector magnet shall be capable of drawing up the armature so the driving pawl falls into the next tooth when the pull of the driving spring is supplemented by the pressure specified in the charts applied horizontally with a push-gram gauge at a point opposite the standard point of measurement.

Use the 79B or C gauge.

Note: When checking 209-type selectors, if any difficulty is experienced in meeting this requirement it may be due to heating of the magnet coil, in which case the magnet should be allowed to cool.

- 2.19 Step Test:** Fig. 8(A) and 9(A)—The selector shall be capable of taking a full step where the rotor brushes step onto the feeder brushes when the load on the driving spring is increased by the application of the tension specified in the charts furnished with the section applied at the standard point of measurement in a horizontal direction opposed to the pull of the driving spring. This requirement shall be met at both ends of the rotor brushes.

Use the 79B or 79C gauge.

2.20 Rotor Brush Alignment: Fig. 10

(A)—The junction between each pair of rotor brush springs shall line up with the center line of the associated bank feeder brush within 0.014 inch when the brushes are in the position in which they are about to pass onto the feeder brushes. In case the bank feeder brushes have been cut away, this requirement shall apply to the first row of bank terminals.

Gauge by eye.

Bank terminals and single-piece-type feeder brushes are 0.014 inch thick.

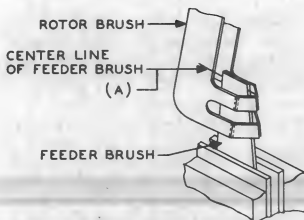


Fig. 10—Rotor Brush Alignment

2.21 Feeder Brush Position: Each feeder brush shall meet the requirement listed in Table B for the particular type of feeder brushes involved.

TABLE B

FEEDER BRUSH REQUIREMENTS

BANK FEEDER BRUSHES		
SINGLE PIECE TYPE (FIG. 12, 13, 14)	SINGLE PIECE TYPE (FIG. 15)	TWO PIECE TYPE (FIG. 16)
(a)	(a) (b)	(a)
(d)	(d)	(d)
(e)	(e)	(e)
(f)	(f)	(f)
DETACHABLE FEEDER BRUSHES		
SINGLE PIECE TYPE (FIG. 14)	SINGLE PIECE TYPE (FIG. 15)	TWO PIECE TYPE (FIG. 16)
(a)	(a) (b)	(a)
(d)	(d)	(c) (d)
(f) (g)	(f) (g)	(g)

(a) **Fig. 7(D)**—The prongs of the feeder brush shall not touch the spacing washers on the rotor at any point in the revolution of the rotor.

(b) **Fig. 7(E)**—When the feeder brush is pushed away from the rotor with pressure applied

on the center line of the feeder brush and close to the crotch, the two prongs shall leave the rotor at the same time.

Gauge by eye.

(c) **Fig. 11(A)**—The points of contact between the feeder brushes and the rotor brush hub shall be

Min 0.015 inch

within the outside edge of the rotor brush hub.

Gauge by eye.

The single-piece-type feeder brushes are 0.014 inch thick. Each spring of the chromium-plated, 2-piece-type feeder brush is approximately 0.009 inch thick, and each spring of the nonchromium-plated, 2-piece-type feeder brush is 0.007 inch thick.

(d) The unformed portions of the feeder and rotor brushes shall clear each other at all positions of the rotor by

Min 0.010 inch

Gauge by eye.

(e) **Fig. 7(F)**—That part of the feeder brush over which the rotor brushes pass shall be in alignment with the bank terminals within 0.010 inch.

Gauge by eye.

(f) The contacting portion of the feeder brushes shall make contact with and be approximately parallel to the face of the rotor brush hub throughout a complete revolution of the rotor brushes and shall meet the following requirements with relation to the periphery of the hub.

(1) **Single-Piece-Type Feeder Brushes:**
Fig. 12, 13, 14, 15—The contacting portion of the tip shall not extend beyond the periphery of the hub more than 0.015 inch.

Gauge by eye.

(2) **Two-Piece-Type Feeder Brushes:**
Fig. 16—The contacting portion of the

tip shall not extend beyond the periphery of the hub.

Gauge by eye.

(g) With one end of the rotor brushes resting on the fifth row of bank terminals, the center line of that part of the feeder brush over which the rotor brush passes shall line up with the junction of the associated pair of rotor brush springs within 0.010 inch.

Gauge by eye.

The single-piece-type feeder brushes are 0.014 inch thick. Each spring of the chromium-plated, 2-piece-type feeder brush is approximately 0.009 inch thick, and each spring of the nonchromium-plated, 2-piece-type feeder brush is 0.007 inch thick.

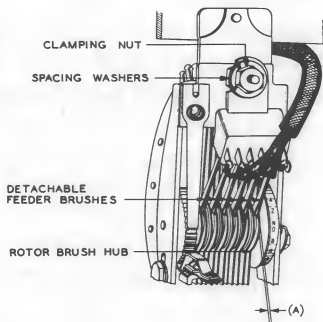


Fig. 11—Detachable Feeder Brush

2.22 Feeder Brush Tension

Single-Piece-Type Feeder Brushes per Fig. 12, 13, and 14

(a) *Fig. 12(A), 13(A), and 14(A)*—The tension of the front prong of the feeder brush against the associated rotor brush hub,

measured on the prong just below the contact or tip, shall be

Test—Min 20 grams, max 45 grams

Readjust—Min 25 grams, max 40 grams

Use the 70J gauge and proceed as follows:

(1) Step the selector electrically to a position where the rotor brushes are approximately 60 degrees from the upper vertical part of the frame.

(2) Block the rotor brush assembly by placing the 0.012-inch blade of the 74D gauge between the right side of the selector frame and the end of the rotor projecting beyond the nut.

Note: Newer-type selectors may not accept the 0.012-inch gauge designation. Adjust accordingly.

(3) Place a toothpick between the left side of the frame and the adjacent end of the rotor above the shaft.

(4) Measure the tension of the front prong.

(5) Remove the gauge blade and toothpick.

(6) Step the selector electrically 180 degrees, and repeat the check.

(b) *Fig. 12(B), 13(B) and 14(B)*—The rear prong shall reliably contact the rotor brush hub.

Gauge by eye and feel.

To check this requirement, block the rotor brush assembly as covered in (a) and apply the KS-6320 orange stick to the rear prong to check that the prong is making contact with the hub.

Single-Piece-Type Feeder Brushes per Fig. 15

(c) *Fig. 7(E)*—The tension of each feeder brush against the associated rotor brush hub measured at a point on the center line of the feeder brush and close to the crotch shall be

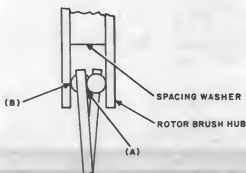


Fig. 12—Single-Piece-Type Feeder Brush—Balanced Type With Two Welded Contacts

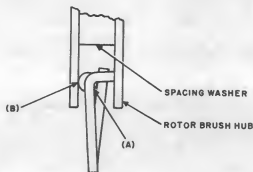


Fig. 13—Single-Piece-Type Feeder Brush—Balanced Type With One Welded Contact and One Formed Tip

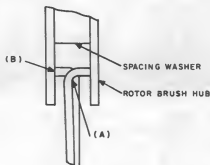


Fig. 14—Single-Piece-Type Feeder Brush—Balanced Type With Two Formed Tips

Test—Min 65 grams, max 90 grams

Readjust—Min 70 grams, max 90 grams

Use the 70J gauge, and check as follows:

- (1) Step the selector electrically to a position where the rotor brushes are approximately 60 degrees from the upper vertical part of the frame.
- (2) Block the rotor brush assembly by placing the 0.012-inch blade of the 74D gauge between the right side of the selector frame and the end of the rotor projecting beyond the nut.
- Note:** Newer-type selectors may not accept the 0.012-inch gauge designation. Adjust accordingly.
- (3) Place a toothpick between the left side of the frame and the adjacent end of the rotor above the shaft.
- (4) Measure the tension.

When checking the tension of the No. 1 brush, the 70J gauge cannot be used. Therefore, the requirement on this brush is met if the tension as determined by feel, using the KS-6320 orange stick, is approximately the same as the tension of another brush which meets the requirement when checked with the 70J gauge.

- (5) Remove the gauge blade and toothpick.
- (6) Step the selector electrically 180 degrees, and repeat the check.

Two-Piece-Type Feeder Brushes per Fig. 16

- *(d) With adjacent brushes held away, the spread of the contact ends of the 2-piece-type brushes shall be approximately 3/8 inch. The clamped part of the retaining pawl is 3/8 inch wide.

Gauge by eye.

2.23 Rotor Brush Tension: The tension of each member of a brush pair, measured at a point approximately midway between the prongs of the brush member with the brushes on the

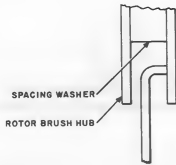


Fig. 15—Single-Piece-Type Feeder Brush—Nonbalanced Type With Two Formed Tips

topmost row of terminals, shall be within the limits specified in charts furnished with the section.

Use the 70J gauge, and proceed as follows.

- (1) Step the selector electrically so the brushes are on the topmost row of terminals.
- (2) Block the rotor brush assembly by placing the 0.012-inch blade of the 74D gauge between the right side of the selector frame and the end of the rotor projecting beyond the nut and a toothpick between the left side of the frame and the adjacent end of the rotor above the shaft.

Note: Newer-type selectors may not accept the 0.012-inch gauge designation. Adjust accordingly.

- (3) Apply the 70J gauge between the prongs of each brush member.
- (4) Remove the blade and toothpick.
- (5) Step the selector electrically 180 degrees, and repeat the check.

Note: On selectors equipped with detachable feeder brushes, it will be satisfactory to check this requirement with the rotor brushes on the detachable feeder brushes instead of on the topmost row of terminals.

2.24 Rotor Brush Prong Contact:

Fig. 17(B)—At least one of the two prongs of each individual brush member shall make contact with the associated bank feeder brush. The other

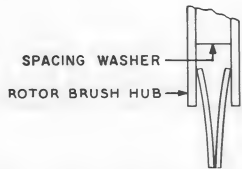


Fig. 16—Two-Piece-Type Feeder Brush

prong shall not be away from the feeder brush more than 0.005 inch. In case the bank feeder brushes have been cut away, this requirement shall apply to the first row of bank terminals.

Gauge by eye.

In doubtful cases, touch the prongs of the brushes with the end of the KS-6320 orange stick and note whether or not both prongs make contact with the bank feeder brush or bank terminal in cases where the feeder brushes are not away. The feel of the tool will be an aid to the visual check for the requirement.

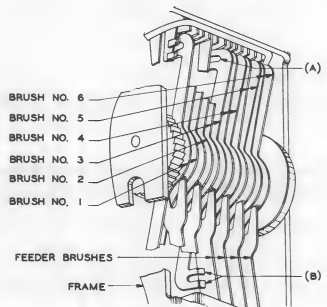


Fig. 17—Rotor and Feeder Brushes

2.25 Toeing of Bridging Brushes: Fig. 18

(A)—When a bridging rotor brush is not contacting with the feeder brush or bank terminals, both pairs of trailing edges of tips of the brush shall toe out. The maximum separation between each pair of tips shall not exceed 0.010 inch when the brush members are making contact with each other.

Gauge by eye.

Note: At least one pair of contacting surfaces of the brush shall make contact with each other.



Fig. 18—Bridging Brush

2.26 Heel Spacing

- (a) **Fig. 19(A)**—The clearance between brush members of adjacent pairs when the brushes are in contact with the bank terminals shall be

Min 0.030 inch

Gauge by eye.

The bank terminals are 0.014 inch thick.

This requirement shall be checked on the topmost row of terminals. On selectors equipped with detachable feeder brushes, it will be satisfactory to check for this requirement on the detachable feeder brushes.

- (b) **Fig. 20(A)**—The heels of the rotor brush members shall clear the sides of the bank feeder brushes just before the rotor brushes engage the feeder brushes by

Min 0.015 inch

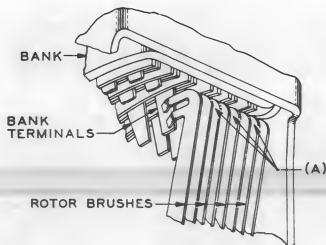


Fig. 19—Heel Spacing Between Brush Members of Adjacent Pairs

Gauge by eye.

The bank terminals are 0.014 inch thick.

In case the bank feeder brushes have been cut away, this requirement shall apply to the first row of bank terminals.

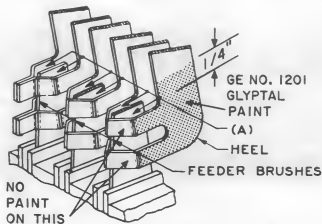


Fig. 20—Heel Spacing Between Brush Members and Bank Feeder Brushes

Endplay

- 2.27** The rotor brush assembly shall have endplay on its shaft of a perceptible (sight or feel)

minimum, 0.014 inch maximum. This requirement shall be met throughout a 360-degree revolution of the rotor brush assembly.

Note: This requirement shall apply only to selectors made after September 1973.

2.28 False Contacting

- (a) **Nonbridging Brushes:** Fig. 21(A)—The clearance between the heels of nonbridging brush members and their associated bank terminals when their contacting edges are in contact with each other between the bank feeder brush and the first bank terminal, the eleventh and twelfth terminals, and the second and third terminals from the top of the bank shall be

Min 0.015 inch

Gauge by eye.

The bank terminals are 0.014 inch thick.

In case the bank feeder brushes have been cut away, this requirement shall apply between the first and second bank terminals.

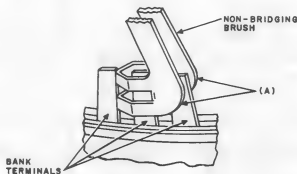


Fig. 21—Nonbridging Brush

- (b) **Bridging Brushes:** Fig. 22(A)—The heels of bridging brushes shall clear the first bank terminal just before the rotor brushes engage the feeder brushes by

Min 0.015 inch

Gauge by eye.

The bank terminals are 0.014 inch thick.

In case the bank feeder brushes have been cut away, this requirement shall apply to the second row of terminals.

- (c) The heels of the rotor brushes shall clear the bank terminals by 0.016 inch with the rotor brush assembly endplay taken up in adverse direction. Nonbridging brushes shall be checked (1) at the second terminal when the rotor brush tips are in contact with each other between the feed brush and the first terminal, (2) at the thirteenth terminal when the rotor brush tips are in contact with each other between the eleventh and twelfth terminals, and (3) at the twenty-second terminal when the rotor brush tips are in contact with each other between the twentieth and twenty-first terminals. Bridging brushes shall be checked at the first terminal, just before the rotor brush engages the feeder brushes.

- (d) Step-by-step offices equipped with rotary-out-trunk-switches (ROTS) may experience unacceptable levels of impulse noise. The prime cause of these failures is the false contacting of the rotor brush heels as they rotate across the bank terminals. Use the following procedure to prevent false contacting and reduce impulse noise.

- (1) Make busy those selectors to be painted.
- (2) Remove any burrs from the rotor brush heels.
- (3) Align and adjust the rotor and bank contacts according to this practice.
- (4) Using the R-2966 brush, apply two thin coats of General Electric (GE) Glyptal No. 1201 paint to both sides of the tip and ring heels of the ROTS wiper brush, Fig. 20 and allow to dry overnight.

Note: If thinning of the GE No. 1201 paint is required, use GE thinner No. 1500.

- 2.29 Contact Alignment:** The point of contact shall fall wholly within the boundary of the opposing contact.

Gauge by eye.

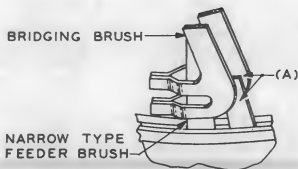


Fig. 22—Bridging Brush

2.30 Position of Inside Interrupter Spring (Spring No. 1): The long insulator shall be held against the offset end of the bracket by the pressure of the No. 1 contact spring.

Gauge by eye and feel.

2.31 Tension of Outside Interrupter Spring (Spring No. 2): Fig. 8(C) and 9 (C)—The tension of the outside interrupter spring (spring No. 2), measured in line with the outside interrupter spring contact, shall be within the limits specified in the charts furnished with the section.

Use the 79B gauge.

A small loop of twine may be used to attach the end of the gauge to the outside interrupter spring.

2.32 High-Voltage Interrupter Contact Test: The selector shall start from the normal position and continue to operate steadily and uniformly when the high voltage specified in the charts furnished with the section is applied across the selector circuit and when a gauge of the thickness specified in the charts is held between the mica-*t* insulator and the spring stop directly behind the contact on the No. 1 interrupter spring. If no information appears in the charts, this requirement shall not apply.

Use the 74D gauge.

Where "(No Gauge)" appears in the charts, this requirement shall apply but no gauge shall be inserted behind the contact on the No. 1 interrupter spring.

2.33 Low-Voltage Interrupter Contact

Test: The selector shall start from the normal position and continue to operate steadily and uniformly on the low voltage specified in the charts furnished with the section when a gauge of the thickness specified in the charts is held between the lip of the No. 2 interrupter spring and the driving arm stud. If no information appears in the charts, this requirement shall not apply.

Use the 74D gauge.

Take care to hold the gauge parallel to the lip of the interrupter spring and not to apply any pressure which would tend either to lift the spring away from the stud or to impede its action.

Note: Where "(No Gauge)" appears in the charts, this requirement shall apply but no gauge shall be held between the lip of the No. 2 interrupter spring and the driving arm stud. All interrupter operation requirements 2.32, 2.33, 2.34, and any special requirements covered by the notes following the charts should be met with the same interrupter adjustment.

2.34 Interrupter Contact Break—209A

Selector: Fig. 9(B)—With the rotor brush assembly rotated backward far enough to take up all the play between the retaining pawl and the ratchet wheel tooth and with the driving pawl latched in a tooth of the ratchet wheel after manually operating and releasing the selector, the interrupter contacts shall not be open but shall open with a 0.006-inch gauge between the outside interrupter spring and the driving arm stud. This requirement shall be checked in four positions of the selector approximately 90 degrees apart.

Use the 74D gauge, and proceed as follows.

- (1) Remove the circuit fuse which supplies the battery to the selector circuit.
- (2) Connect the pin terminals of the KS-14250, L1 flashlight to the interrupter spring terminals by means of two 1W18B cords.
- (3) Operate the flashlight switch. The flashlight should light.
- (4) Take up all the play between the retaining pawl and the ratchet wheel tooth by pressing

against the rotor brushes in a direction opposite normal rotation.

(5) While holding the rotor in this position, manually operate and then partially release the selector armature so the driving pawl engages the next ratchet wheel tooth. The flashlight should light.

(6) Remove the 0.006-inch blade from the holder of the 74D gauge.

(7) Insert it between the driving arm stud and the outside interrupter spring.

Note: Do not hold the blade as this might affect the position of the outside interrupter spring.

(8) The flashlight should be extinguished. Remove the flashlight connections, and replace the circuit fuse when the requirement is met.

Warning: *If the selector test is connected across the battery bus bar fuse screw and the fuse post stud, as in making voltage tests, do not operate the HV or LV keys of the test set while the flashlight is connected across the interrupter contacts.*

2.35 Clearance Between Driving Arm Stud and Interrupter Spring: (Applies only to those selectors listed below.)

(a) **Fig. 8(B)**—Where the interrupter spring (spring No. 2) is connected in a circuit, the clearance between the driving arm stud and this spring shall be:

(1) **200AA, 200AM, 200AN, 200AS, 200BA, 206S, 206AE, 206AF, 206AJ, 206AN, 206AU, 206AW, 206BA, 206BE, 206BF, 206BN, 206BP, 206BR, 206CK,**

209B, 211A, D-78143, D-160593, and D-178258 Selectors Only

Test—Min 0.035 inch

Test—Max 0.056 inch

Readjust—Min 0.041 inch

Readjust—Max 0.050 inch

Use the 131A gauge.

(2) **200E and 206D Selectors Only**

Test—Max 0.012 inch

Readjust—Min 0.004 inch

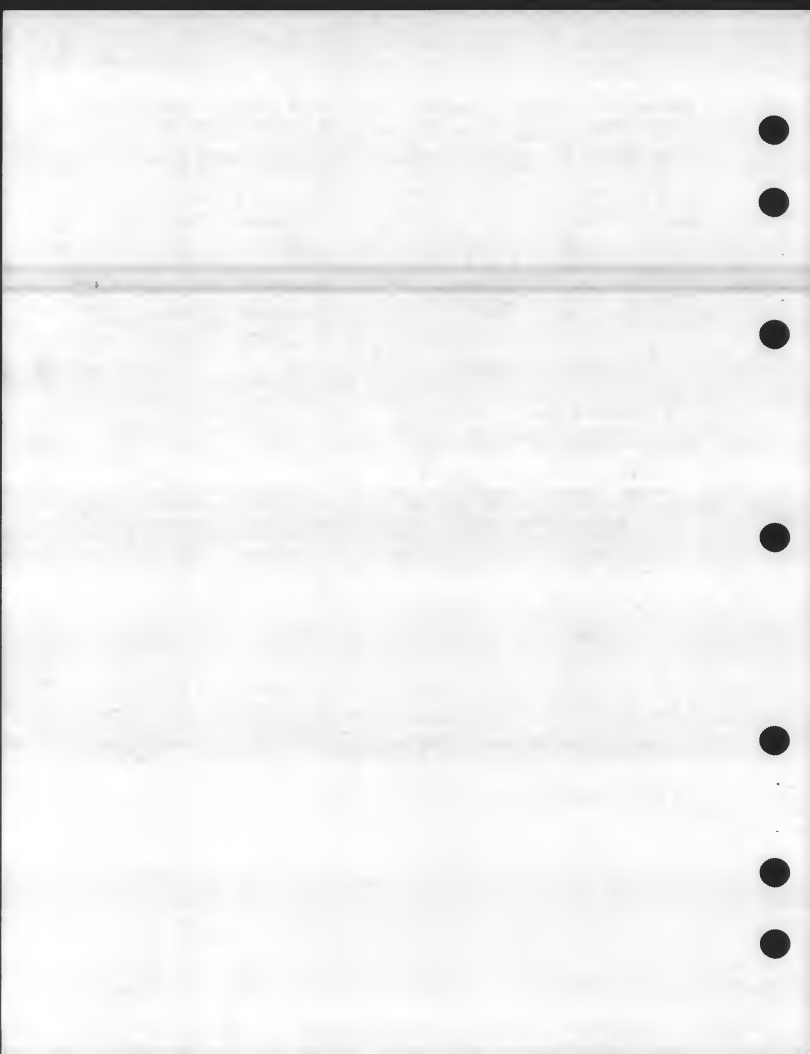
Readjust—Max 0.012 inch

Use the 74D gauge.

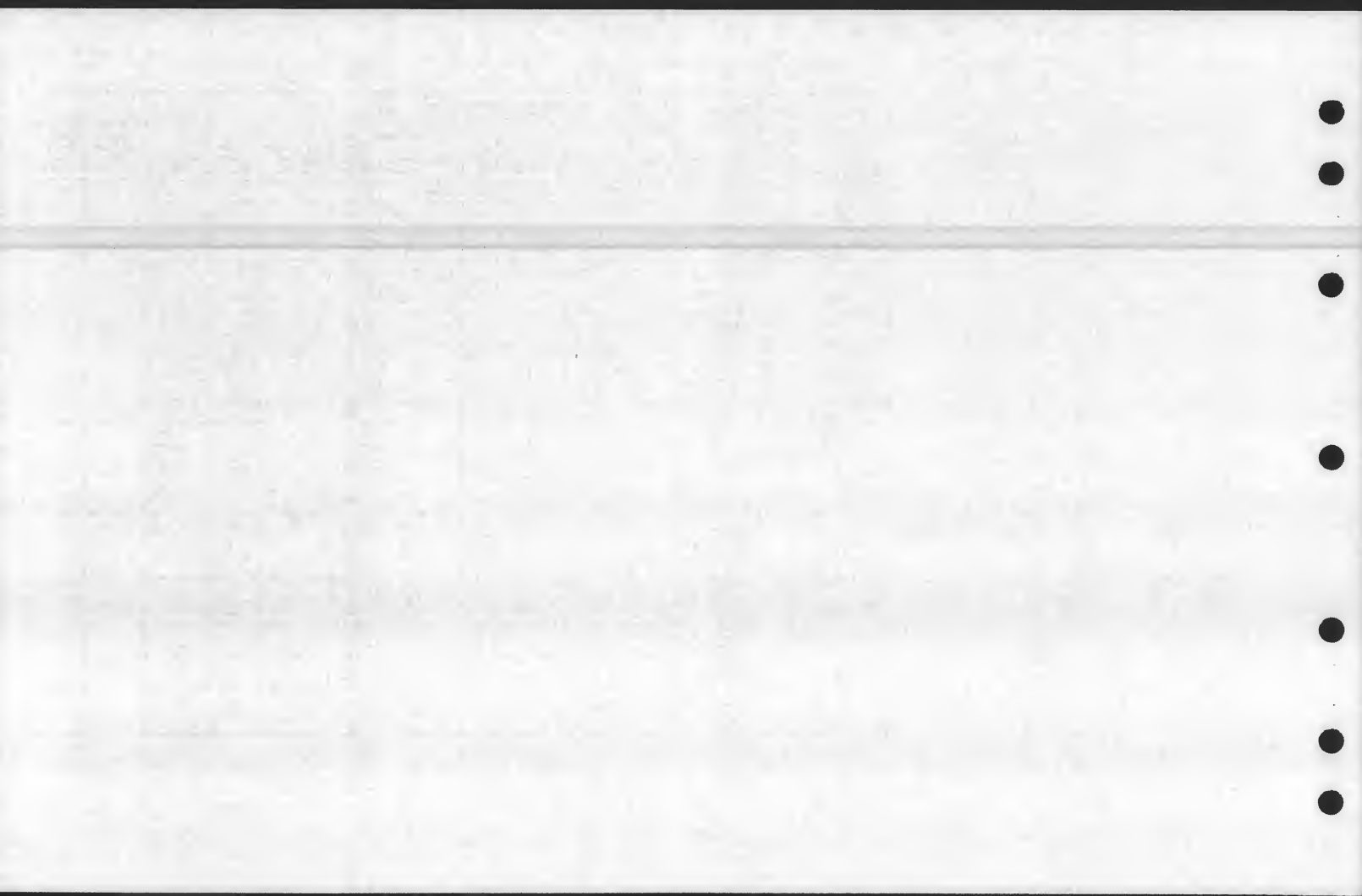
(b) The selectors covered in (a) shall rotate step by step for two complete revolutions on low voltage.

2.36 Speed: The rotor brushes shall pass over not less than the specified number of terminals per second (TPS) when the low voltage specified in the charts furnished with the section is applied across the selector circuit. Determine the speed of the selector by timing five complete revolutions (220 steps) of the rotor brush assembly with the stopwatch or equivalent. If the TPS is not specified in the charts, this requirement shall not apply.

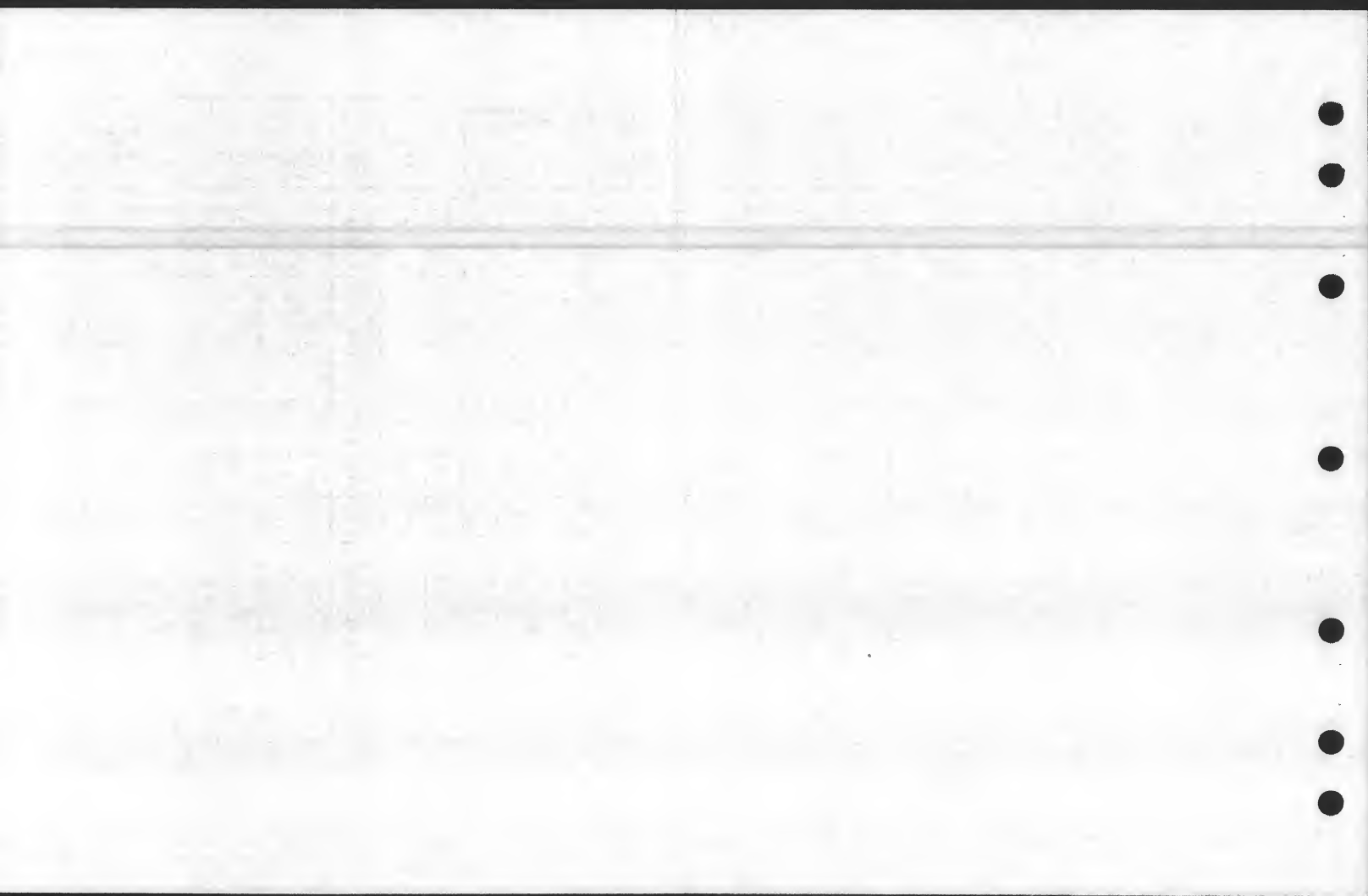
2.37 Variable Requirements: The values listed in the charts shall apply in checking any requirements calling for the application of high or low voltage and in checking 2.23 (Rotor Brush Tension), 2.14 (Driving Spring Tension), 2.31 (Tension of Outside Interrupter Spring), 2.18 (Magnet Pull Test), 2.19 (Step Test), 2.36 (Speed), 2.32 (High-Voltage Interrupter Contact Test), and 2.33 (Low-Voltage Interrupter Contact Test). In addition, any requirements covered in the notes shall apply to selectors as indicated in the charts.



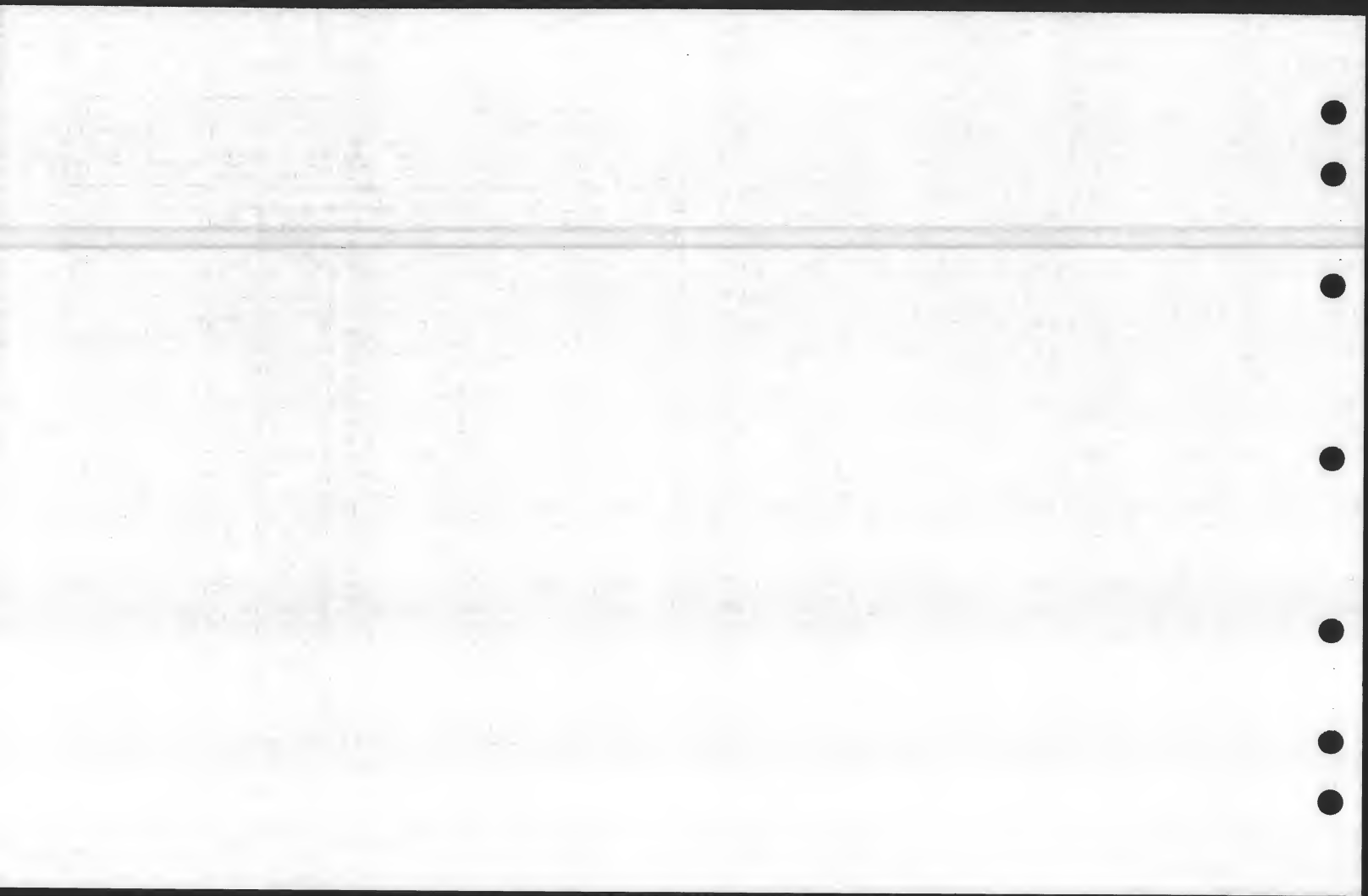
SELECTOR	BANK	SEE NOTE	LOW VOLTAGE		HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.34 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)	
						BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6								
						45- TO 50-VOLT SELECTORS													
206A 200B	26A,26D 10B,10E	1	T	Min	50	20	20	20	20	20	20	800	100	50	150	20	0.003 inch	0.003 inch	
			Max	45		40	40	40	40	40	40		400						
			R	Min	51	25	25	25	25	25	25	800	100	50	300	20			
			Max	44		40	40	40	40	40	40		400						
206A 200B	26A 10B	2	T	Min	50	30	20	20	20	20	20	800	100	45	150	20	0.003 inch	0.003 inch	
			Max	45		50	40	40	40	40	40	40		400					
			R	Min	51	35	25	25	25	25	25	800	100	50	300	20			
			Max	44		50	40	40	40	40	40		400						
206B 200A	26A,26B 10A,10B		T	Min	50	15	15	25	25	15	15	800	100	50	150	40	(No Gauge)	0.002 inch	
			Max	45		35	35	45	45	35	35		400						
			R	Min	51	20	20	30	30	20	20	800	100	50	300	40			
			Max	44		35	35	45	45	35	35		400						
206C 200D	26D 10E	1	T	Min	50	15	15	15	15	15	15	500	100	225	75		(No Gauge)	0.002 inch	
			Max	45		35	35	35	35	35	35	600	400						
			R	Min	51	20	20	20	20	20	20	500	100	250	150				
			Max	44		35	35	35	35	35	35	600	400						
206D 200E	26C 10D		T	Min		20	20						550	45	300	150			
			Max	45		40	40					650	65						
			R	Min		25	25						550	45	300	300			
			Max	44		40	40					650	65						
206E 200F	26A 10B	3	T	Min	50	20	20	20	20	20	20	700	100	150	100	30	(No Gauge)	0.002 inch	
			Max	45		40	40	40	40	40	40	40		400					
			R	Min	51	25	25	25	25	25	25	25	700	100	150	200			30
			Max	44		40	40	40	40	40	40	40		400					



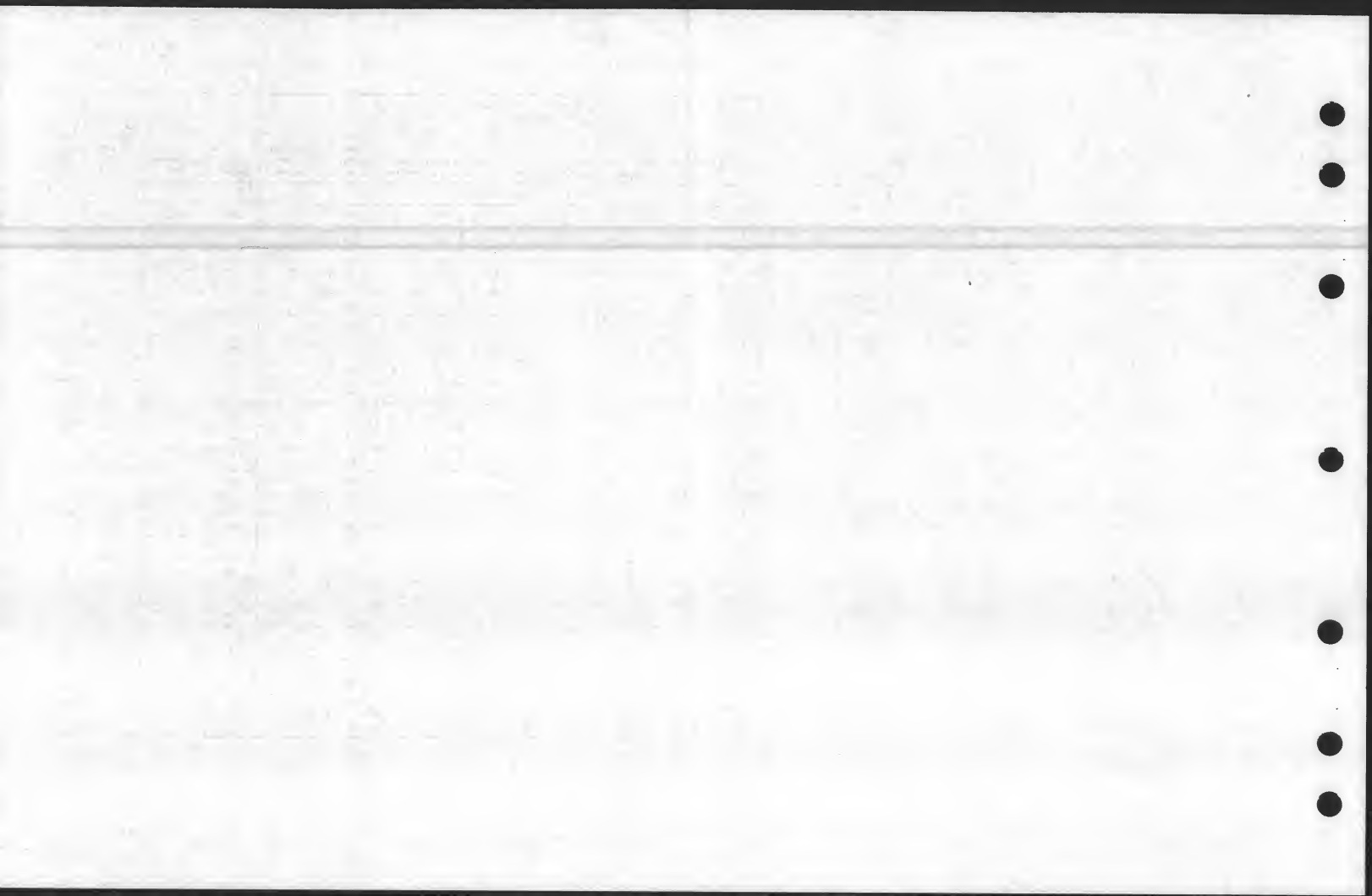
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
							45-TO 50-VOLT SELECTORS (CONTD)												
206G 200H	26A,26D 10E	3	T	Min	50	30	20	20	20	20	750	100	45	150	20	0.003 inch	0.003 inch		
				Max	45	50	40	40	40	40	400								
			R	Min	51	35	25	25	25	25	25	750	100	50	300			20	
				Max	44	50	40	40	40	40	40	400							
206J 200K	26D 10E	4	T	Min	50	15	15	15	15	15	500	100	225	75		(No Gauge)	0.002 inch		
				Max	45	35	35	35	35	35	35	600	400						
			R	Min	51	20	20	20	20	20	500	100	250	150					
				Max	44	35	35	35	35	35	35	600	400						
206J 200K	26D 10E	5	T	Min	50	25	15	15	15	15	500	100	135	75		(No Gauge)	0.002 inch		
				Max	45	50	35	35	35	35	35	700	400						
			R	Min	51	35	20	20	20	20	500	100	150	150					
				Max	44	50	35	35	35	35	35	700	400						
206K 200L	26A,26D 10B,10E		T	Min	50	20	20	20	20	20	800	100	50	150		(No Gauge)	0.002 inch		
				Max	45	40	40	40	40	40	40	400							
			R	Min	51	25	25	25	25	25	800	100	50	300					
				Max	44	40	40	40	40	40	40	400							
206L 200M	26A,26D 10B,10E		T	Min	50	20	20	20	20	20	800	100	50	150		0.003 inch	0.003 inch		
				Max	45	40	40	40	40	40	40	400							
			R	Min	51	25	25	25	25	25	800	100	50	300					
				Max	44	40	40	40	40	40	40	400							
206M 200P	26A 10B		T	Min	50	20	20	20	20	20	800	100	50	150		0.003 inch	0.003 inch		
				Max	45	40	40	40	40	40	40	400							
			R	Min	51	25	25	25	25	25	800	100	50	300					
				Max	44	40	40	40	40	40	40	400							



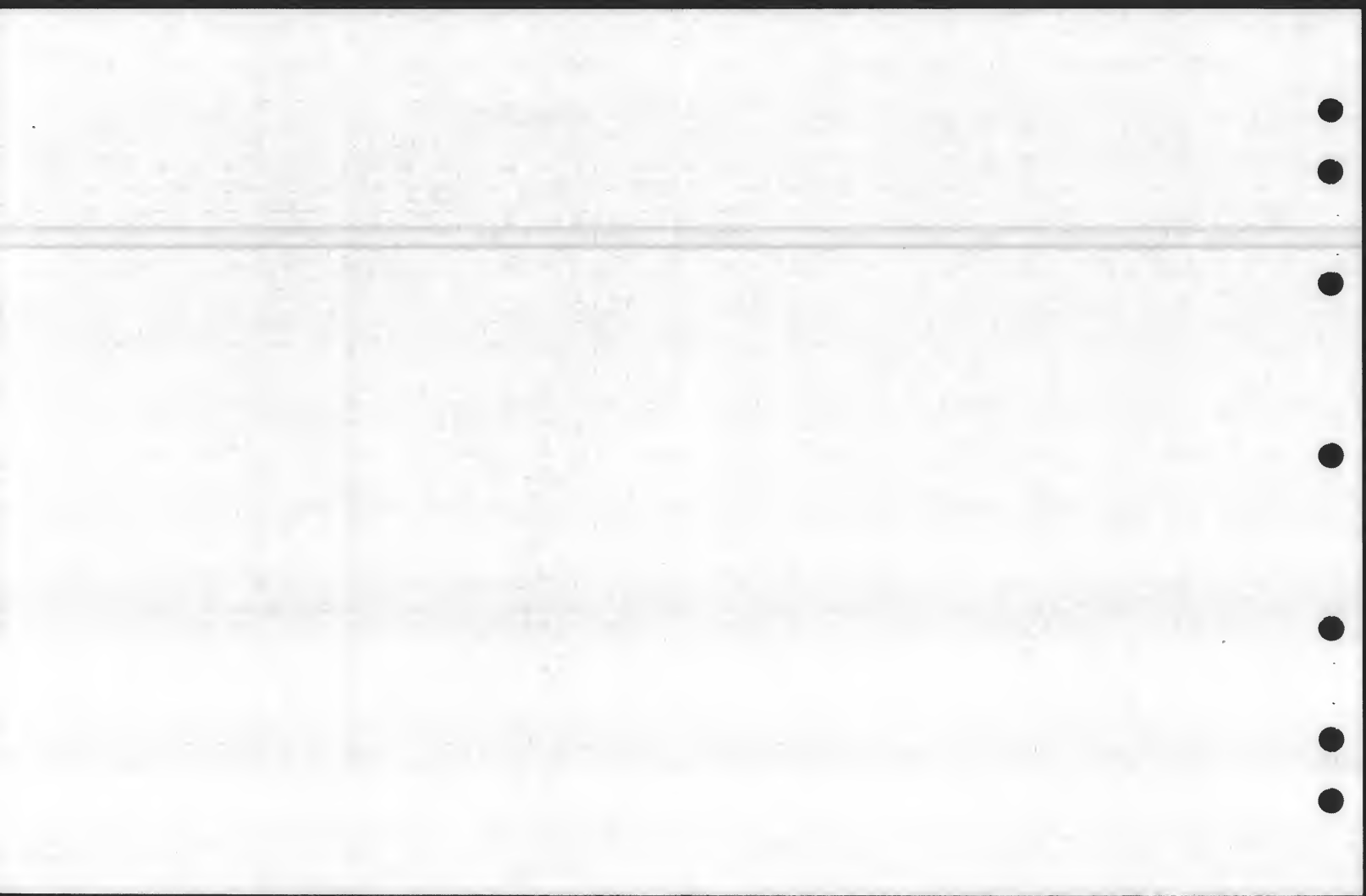
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
45- TO 50-VOLT SELECTORS (CONTD)																			
206N 200R	26E 10F		T	Min		50	20	20	20	20			800	100	50	150		0.003 inch	0.003 inch
				Max	45		40	40	40	40				400					
			R	Min		51	25	25	25	25			800	100	50	300			
				Max	44		40	40	40	40				400					
206P 200S	26A,26D 10B,10E		T	Min		50	25	25	25	25	25	25	800	100	50	150	20	0.003 inch	0.003 inch
				Max	45		45	45	45	45	45	45		400					
			R	Min		51	30	30	30	30	30	30	800	100	50	300	20		
				Max	44		45	45	45	45	45	45	45		400				
200T	26A,26D 10B,10E		T	Min		50	20	20	20	20	20	20	500	100	150	75		(No Gauge)	0.002 inch
				Max	45		40	40	40	40	40	40	700	400					
			R	Min		51	25	25	25	25	25	25	500	100	150	150			
				Max	44		40	40	40	40	40	40	40	700	400				
206R 200U	26A,26D 10B,10E		T	Min		50	20	20	20	20	20	20	800	100	50	150		0.003 inch	0.003 inch
				Max	45		40	40	40	40	40	40		400					
			R	Min		51	25	25	25	25	25	25	800	100	50	300			
				Max	44		40	40	40	40	40	40		400					
206S 200AA	26A 10B		T	Min			20	20	20	20	20	20	800	100	50	150			
				Max	45		40	40	40	40	40	40		400					
			R	Min			25	25	25	25	25	25	800	100	50	300			
				Max	44		40	40	40	40	40	40		400					
206W 200AE	26D 10E		T	Min		50	15	15	15	15	15	15	500	100	150	75		(No Gauge)	0.002 inch
				Max	44		35	35	35	35	35	35	600	400					
			R	Min		51	20	20	20	20	20	20	500	100	150	150			
				Max	43		35	35	35	35	35	35	600	400					



SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
							45- TO 50-VOLT SELECTORS (CONTD)												
206Y 200AF	26D 10E		T	Min		50	30	20	20	20	20	800	100	50	150	20	(No Gauge)	0.002 inch	
				Max	45		50	40	40	40	40	40	400						
				Min		51	35	25	25	25	25	25	800	100	50	300			20
				Max	44		50	40	40	40	40	40	400						
206AA 200AG	26D 10E		T	Min		50	15	15	15	15	15	500	100	150	75		(No Gauge)	0.002 inch	
				Max	44		35	35	35	35	35	35	600	400					
				Min		51	20	20	20	20	20	500	100	150	150				
				Max	43		35	35	35	35	35	35	600	400					
206AB 200AH	26A,26D 10B,10E		T	Min		50	20	20	20	20	20	800	100	50	150		(No Gauge)	0.002 inch	
				Max	45		40	40	40	40	40	40	400						
				Min		51	25	25	25	25	25	25	800	100	50	300			
				Max	44		40	40	40	40	40	40	400						
206AD 200AK	26E 10F		T	Min		50	20	20	20	20		800	100	50	150		0.008 inch	0.003 inch	
				Max	45		40	40	40	40		400							
				Min		51	25	25	25	25		800	100	50	300				
				Max	44		40	40	40	40		400							
206AE 200AM	26E 10J		T	Min			20	20	20	20		550	100	50	75				
				Max	45		35	35	35	35		650	400						
				Min			25	25	25	25		550	100	50	150				
				Max	44		40	40	40	40		650	400						
206AF 200AN	26A,26D 10B,10E		T	Min			30	20	20	20	20	800	100	50	150				
				Max	45		50	40	40	40	40	40	400						
				Min			35	25	25	25	25	25	800	100	50	300			
				Max	44		50	40	40	40	40	40	400						



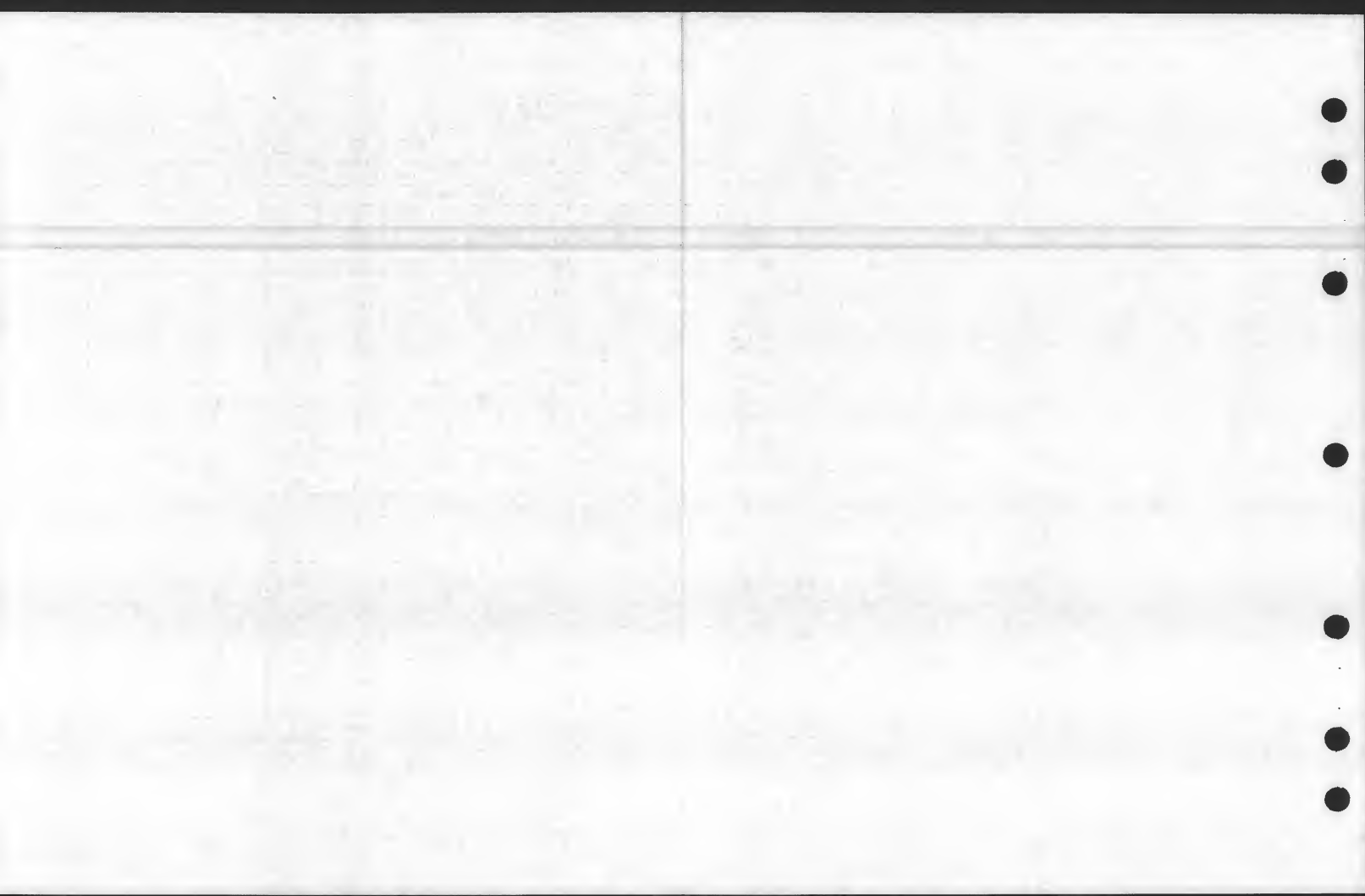
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
45- TO 50-VOLT SELECTORS (CONTD)																			
206AJ 200AS	26E 10J		T	Min			20	20	20	20			550	100	50	75			
				Max	45		40	40	40	40			650	300					
			R	Min			25	25	25	25			550	100	50	150			
				Max	44		40	40	40	40			650	300					
206AL 200AW	26F 10K		T	Min	50		20	20	20	20	20		800	100	50	150	20		
				Max	45		40	40	40	40	40		300						
			R	Min	51		25	25	25	25	25		800	100	50	300	20		
				Max	44		40	40	40	40	40		300						
206AM 200AY	26D 10E		T	Min	50		20	20	20	20	20	20	700	100	200	100			
				Max	45		40	40	40	40	40	40	800	300					
			R	Min	51		25	25	25	25	25	25	700	100	200	200			
				Max	44		40	40	40	40	40	40	800	300					
206AP 200BB	26C 10D		T	Min	50		20	20					800	100	50	150			
				Max	45		40	40					300						
			R	Min	51		25	25					800	100	50	300			
				Max	44		40	40					300						
206AU	26H		T	Min		20	20	20	25	25	30	800	100	50	150				
				Max	45		40	40	40	45	45	50	300						
			R	Min		25	25	25	30	30	35	800	100	50	300				
				Max	44		40	40	40	45	45	50	300						
206AW	26G		T	Min		30	25	25				800	100	50	150				
				Max	45		50	45	45				300						
			R	Min		35	30	30				800	100	50	300				
				Max	44		50	45	45				300						



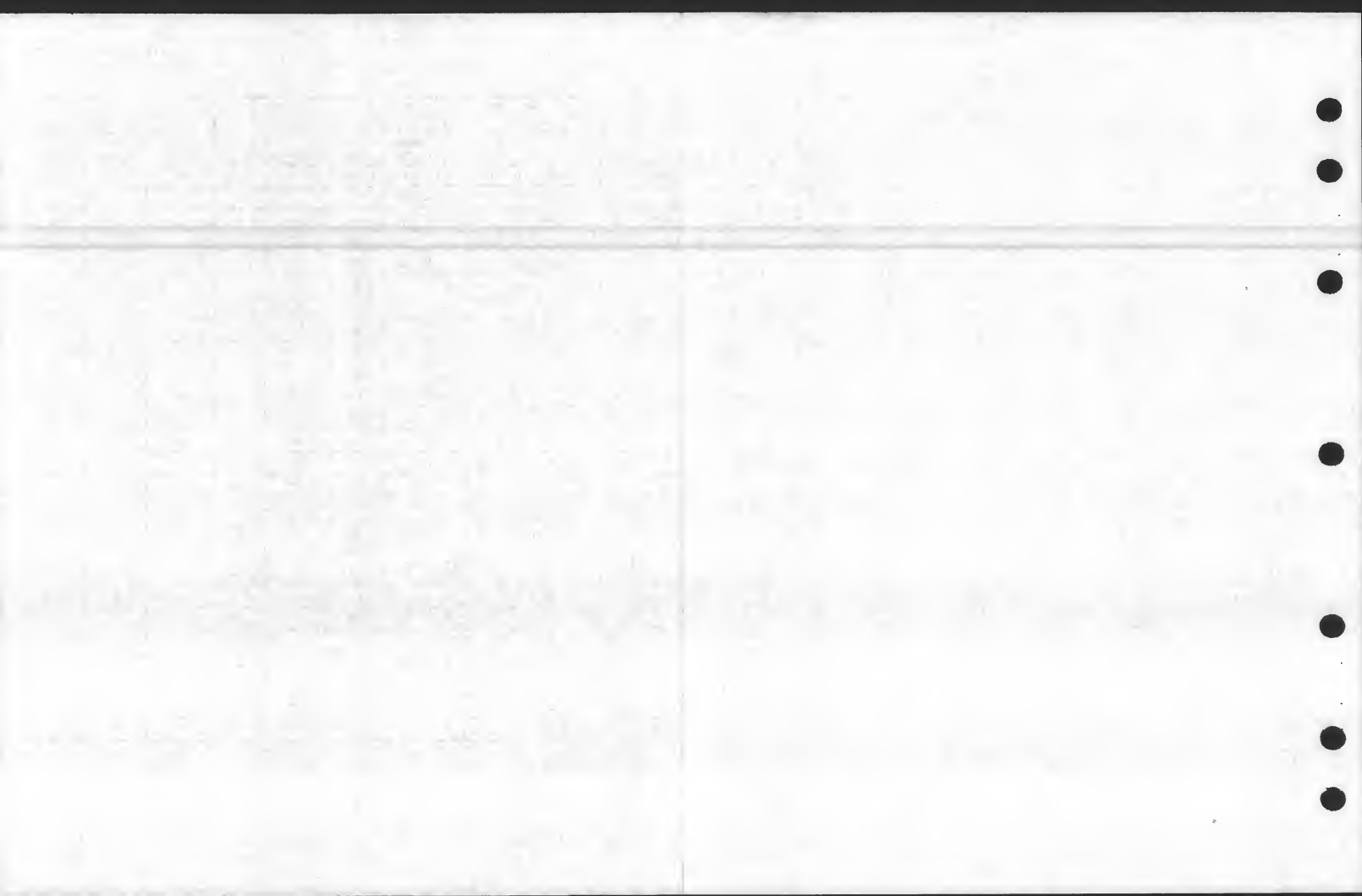
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
45- TO 50-VOLT SELECTORS (CONTD)																			
206BC	26F		T	Min		50	30	25	25	25	25		1000	100	50	100	30	0.002 inch	0.002 inch
				Max	45		50	45	45	45	45			300					
			R	Min		51	35	30	30	30	30		1000	100	50	200	30		
				Max	44		50	45	45	45	45			300					
206BD	26G		T	Min		50	30	25	25				1000	100	50	150	30	0.002 inch	0.002 inch
				Max	45		50	45	45				300						
			R	Min		51	35	30	30				1000	100	50	300	30		
				Max	44		50	45	45				300						
206BL	26F		T	Min		50	30	25	25	25	25		1000	100	50	100	30	0.002 inch	0.002 inch
				Max	45		50	45	45	45	45		300						
			R	Min		51	35	30	30	30	30		1000	100	50	200	30		
				Max	44		50	45	45	45	45		300						
206BP	26A		T	Min			25	25	25	25	30	30	800	100	50	150		0.003 inch	0.003 inch
				Max	45		45	45	45	45	50	50		300					
			R	Min			30	30	30	30	35	35	800	100	50	300			
				Max	44		45	45	45	45	50	50		300					
206BR	26A		T	Min		25	25	25	25	25	30	30	1000	100	50	150		0.003 inch	0.003 inch
				Max	45		45	45	45	45	50	50		300					
			R	Min			30	30	30	30	35	35	1000	100	50	300			
				Max	44		45	45	45	45	50	50		300					
206CE	26A		T	Min		50	25	25	25	25	25	25	750	100	90	150	35	0.003 inch	0.003 inch
				Max	45		45	45	45	45	45	45		300					
			R	Min		51	30	30	30	30	30	30	750	100	90	300	35		
				Max	44		45	45	45	45	45	45		300					



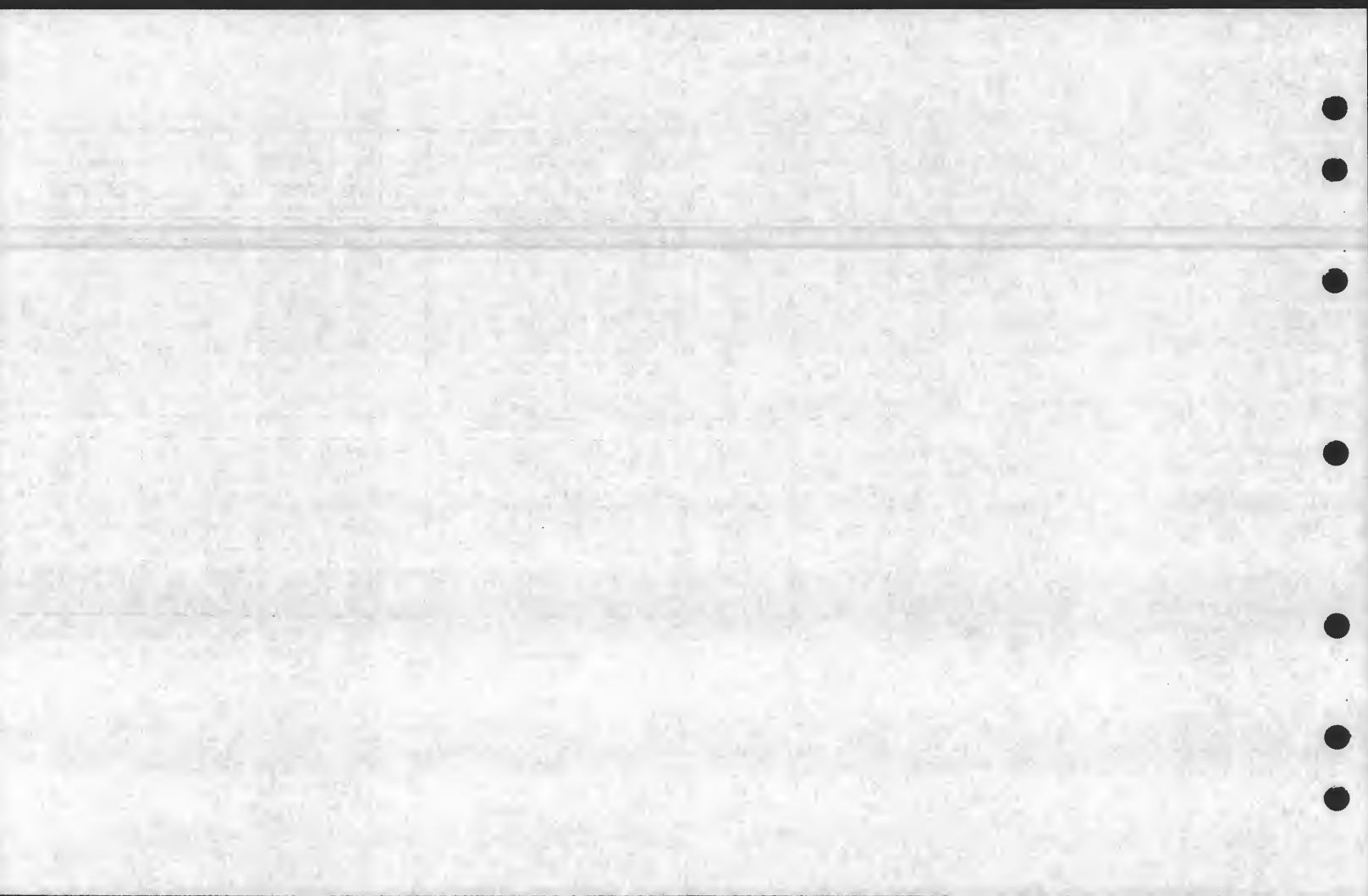
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
							45- TO 50-VOLT SELECTORS (CONTD)												
206CP	26A	3	T	Min		50	20	20	20	20	20	20	800	100	150	100	30	(No Gauge)	0.002 inch
				Max	45		40	40	40	40	40	40		400					
			R	Min		51	25	25	25	25	25	25	800	100	150	200	30		
				Max	44		40	40	40	40	40	40		400					
206CJ	26A	12	T	Min			30	30	20	20	20	20	800	100	50	150			
				Max	45		50	50	40	40	40	40		200					
			R	Min			35	35	25	25	25	25	800	100	50	300			
				Max	44		50	50	40	40	40	40		200					
206CK	26A		T	Min			30	20	20	20	20	20	800	100	50	150			
				Max	45		50	40	40	40	40	40		400					
			R	Min			35	25	25	25	25	25	800	100	50	300			
				Max	44		50	40	40	40	40	40		400					
206CL	26E		T	Min		50	20	20	20	20			800	100	50	100		(No Gauge)	0.002 inch
				Max	45		40	40	40	40				300					
			R	Min		51	25	25	25	25			800	100	50	200			
				Max	44		40	40	40	40				300					
206CM	26A	9	T	Min		50	20	20	20	20	20	20	800	150	50	100		0.003 inch	0.003 inch
				Max	45		40	40	40	40	40	40		300					
			R	Min		51	25	25	25	25	25	25	800	150	50	200			
				Max	44		40	40	40	40	40	40		300					
206CN	26A		T	Min		50	20	20	20	20	20	20	800	100	50	150		0.003 inch	0.003 inch
				Max	45		40	40	40	40	40	40		400					
			R	Min		51	25	25	25	25	25	25	800	100	50	300			
				Max	44		40	40	40	40	40	40		400					



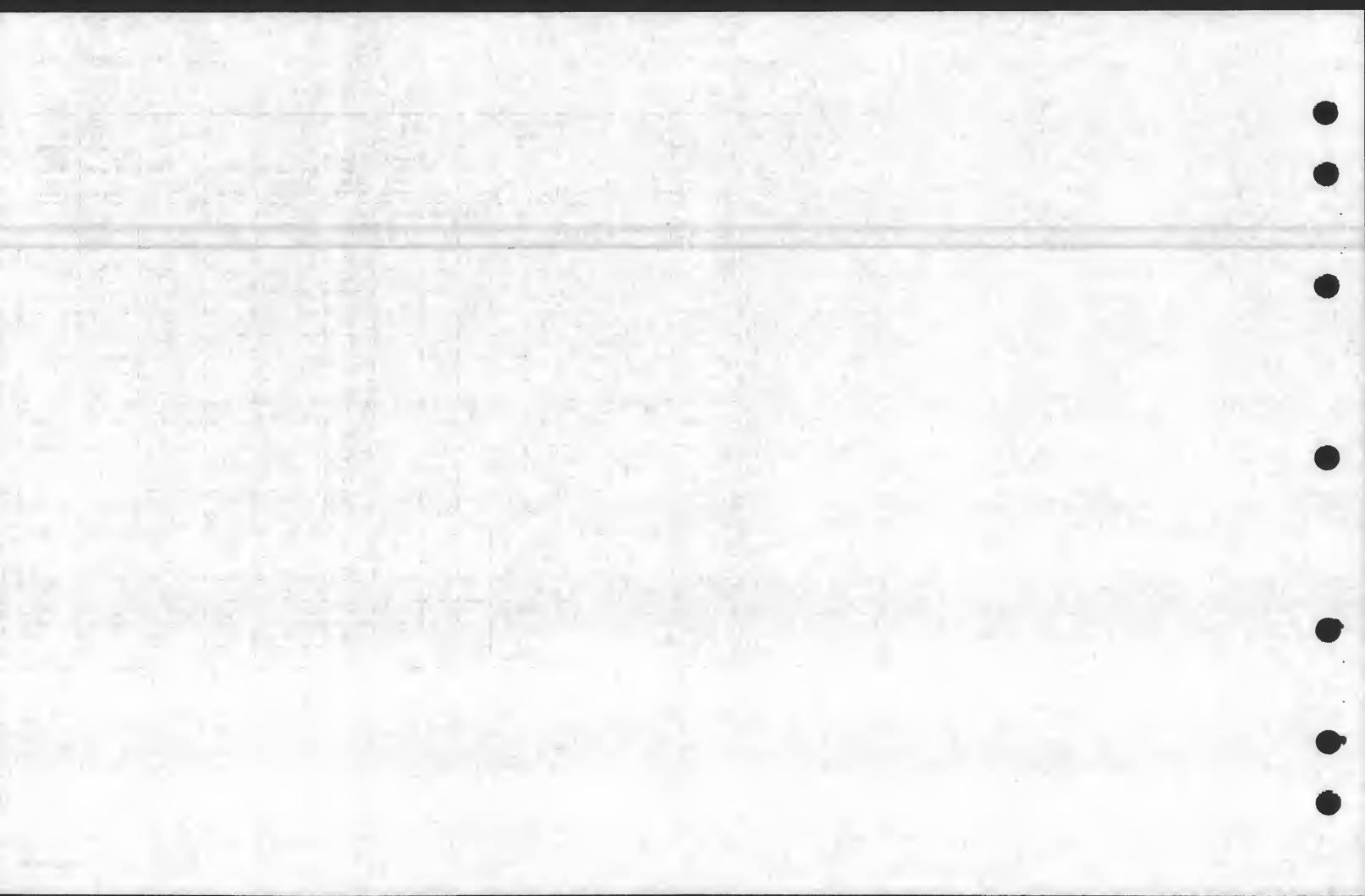
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)	
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6								
45- TO 50-VOLT SELECTORS (CONT'D)																				
206CP	26A	10	T	Min		50	25	25	25	25	25	25	800	100	50	150		0.003 inch	0.003 inch	
				Max	45		45	45	45	45	45	45	45		200					
			R	Min		51	30	30	30	30	30	30	30	800	100	50	300			
				Max	44		45	45	45	45	45	45	45		200					
211A	32A		T	Min			20	20	20	25	25	30	800	100	50	150				
				Max	45		40	40	40	45	45	50		300						
			R	Min			25	25	25	30	30	35	800	100	50	300				
				Max	44		40	40	40	45	45	50		300						
211C	32C		T	Min		50	25	25	25	25	25	25	750	100	90	150	30	0.003 inch	0.003 inch	
				Max	45		45	45	45	45	45	45		300						
			R	Min		51	30	30	30	30	30	30	30	750	100	90	300			30
				Max	44		45	45	45	45	45	45	45		300					
D-178258	26F	11	T	Min			30	25	25	20	20		1000	150	50	100				
				Max	45		50	45	45	40	40			300						
			R	Min			35	30	30	25	25		1000	150	50	200				
				Max	44		50	45	45	40	40			300						
209A	26A	13	T	Min		50	25	25	25	25	25	25	800	100	50	150		(See Note 13.)	(No Gauge)	
				Max	35		45	45	45	45	45	45		300						
			R	Min		51	30	30	30	30	30	30	800	100	50	300				
				Max	33		45	45	45	45	45	45		300						
209B D-160593	26D		T	Min			20	20	20	20	20	20	900	100	100	200				
				Max	45		40	40	40	40	40	40		300						
			R	Min			25	25	25	25	25	25	25	900	100	100	400			
				Max	43		40	40	40	40	40	40	40		300					



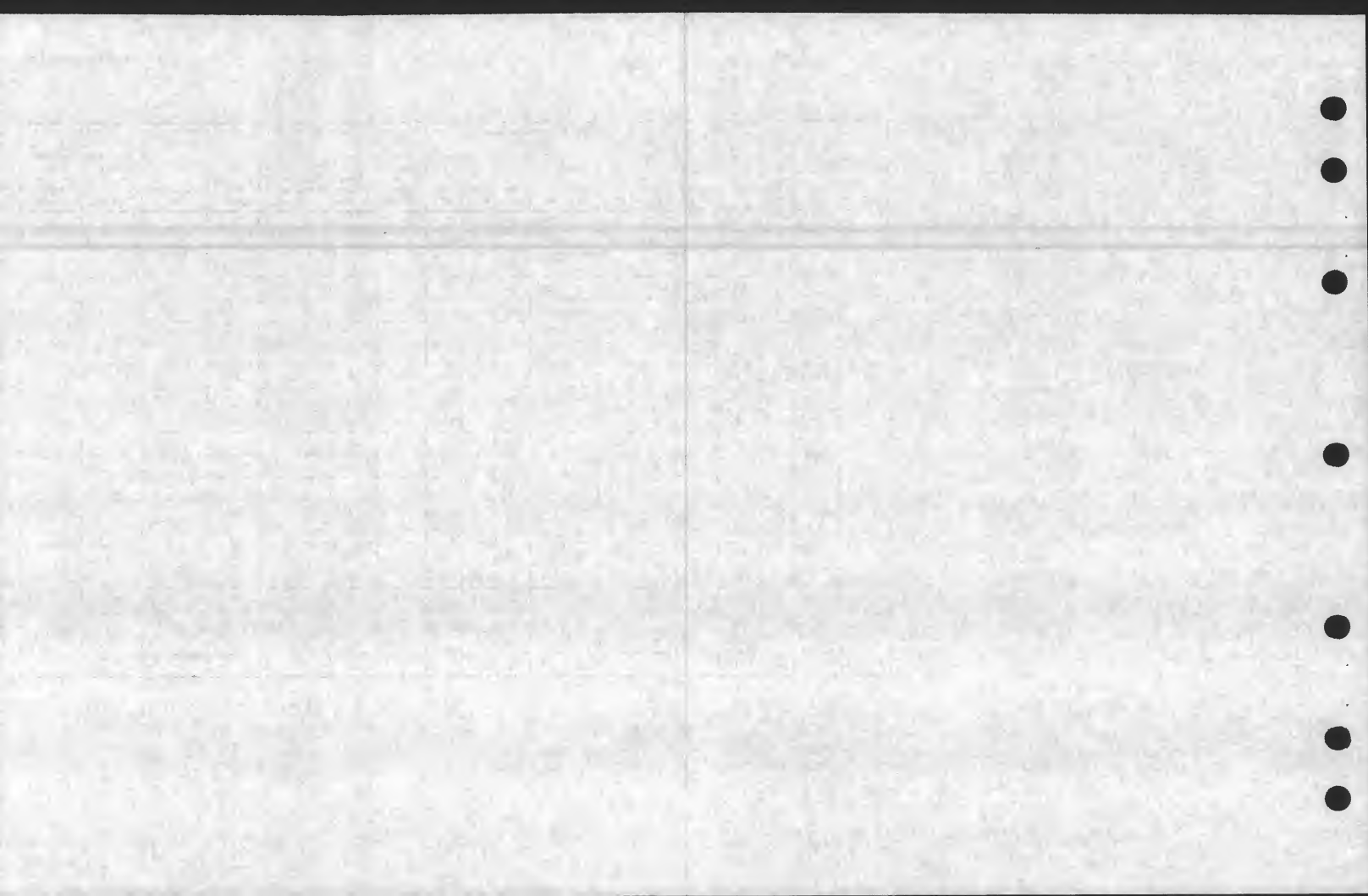
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
45- TO 50-VOLT SELECTORS (CONTD)																			
D-78143	D-78142			T	Min		20	20	20	20		550	100	50	75				
				Max	45	35	35	35	35		650	400							
				R	Min		25	25	25	25		550	100	50	150				
				Max	44	35	35	35	35		650	400							
D-78677	D-78676			T	Min	50	15	15	15	15	15	500	100	180	75				
				Max	45	35	35	35	35	35	600	400							
				R	Min	51	20	20	20	20	20	500	100	200	150		(No Gauge)	0.002 inch	
				Max	44	35	35	35	35	35	600	400							
45- TO 52-VOLT SELECTORS																			
D-80449	26A 10B			T	Min	52	25	25	20	20	20	950	100	50	75	30			
				Max	45	45	45	40	40	40	40	300				0.002 inch	0.002 inch		
				R	Min	53	30	30	25	25	25	25	950	100	50	150	30		
				Max	44	45	45	40	40	40	40	300							
D-161367	26F			T	Min	56	30	25	20	20	25	800	100	50	100	30			
				Max	40	50	45	40	40	45	300					0.002 inch	0.002 inch		
				R	Min	57	35	30	25	25	30	800	100	50	200	30			
				Max	39	50	45	40	40	45	300								



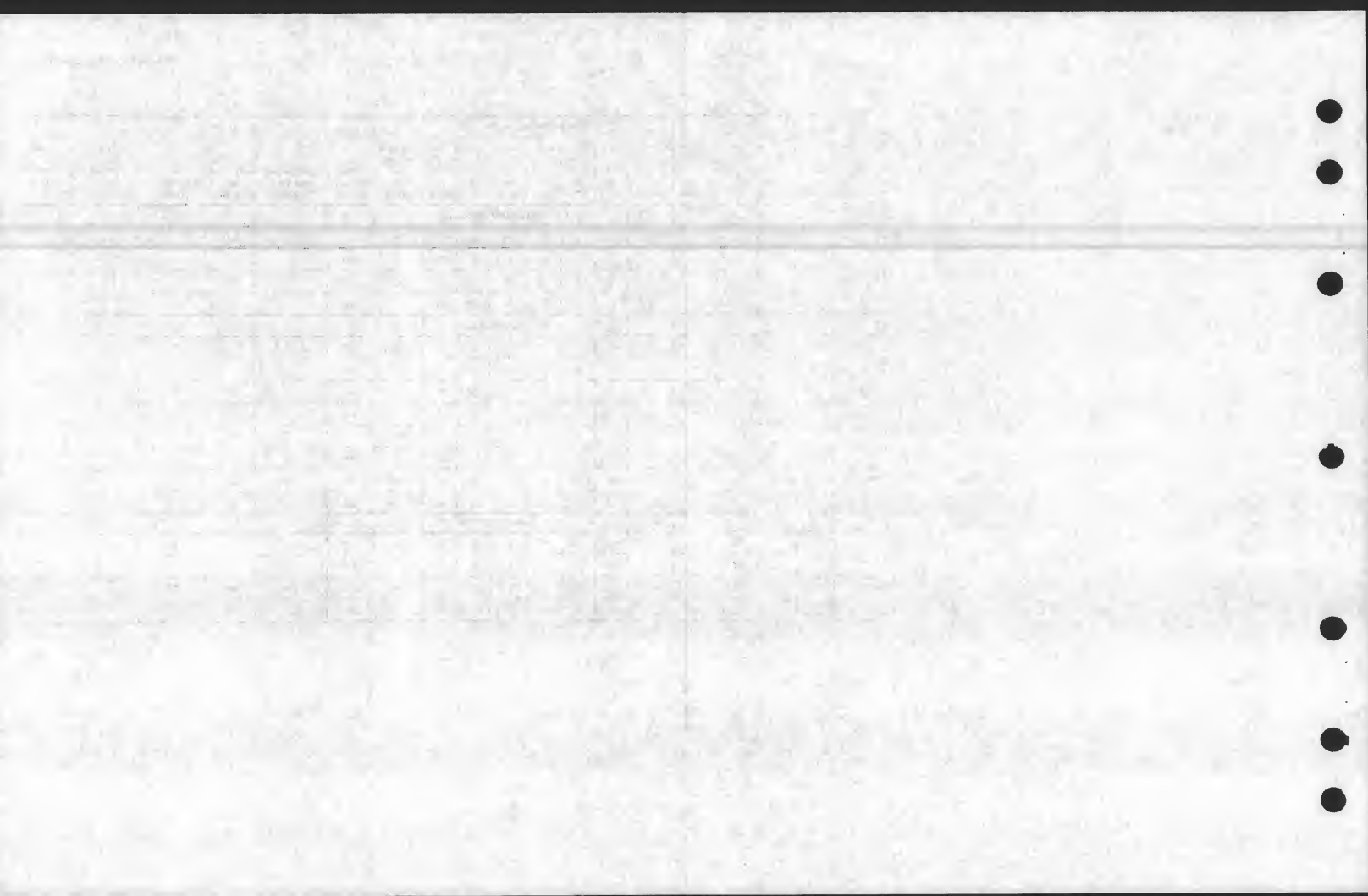
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
							45- TO 52-VOLT SELECTORS (CONTD)												
206BW	26G			T	Min	52	30	20	20				800	100	50	150		0.003 inch	0.003 inch
				Max	44		50	40	40				300						
				R	Min	53	35	25	25				800	100	50	300			
				Max	43		50	40	40				300						
206BY	26E			T	Min	52	30	20	20	20		800	100	50	150		0.003 inch	0.003 inch	
				Max	44		50	40	40	40		300							
				R	Min	53	35	25	25	25		800	100	50	300				
				Max	43		50	40	40	40		300							
206CA	26F			T	Min	52	20	20	20	20	20	800	100	50	150		0.003 inch	0.003 inch	
				Max	44		40	40	40	40	40	300							
				R	Min	53	25	25	25	25	25	800	100	50	300				
				Max	43		40	40	40	40	40	300							
206CC	26F			T	Min	52	20	20	20	20	20	800	100	50	100		0.003 inch	0.003 inch	
				Max	44		40	40	40	40	40	300							
				R	Min	53	25	25	25	25	25	800	100	50	200				
				Max	43		40	40	40	40	40	300							
211B	32B			T	Min	52	30	20	20	20		800	100	50	150		0.003 inch	0.003 inch	
				Max	44		50	40	40	40		300							
				R	Min	53	35	25	25	25		800	100	50	300				
				Max	43		50	40	40	40		300							



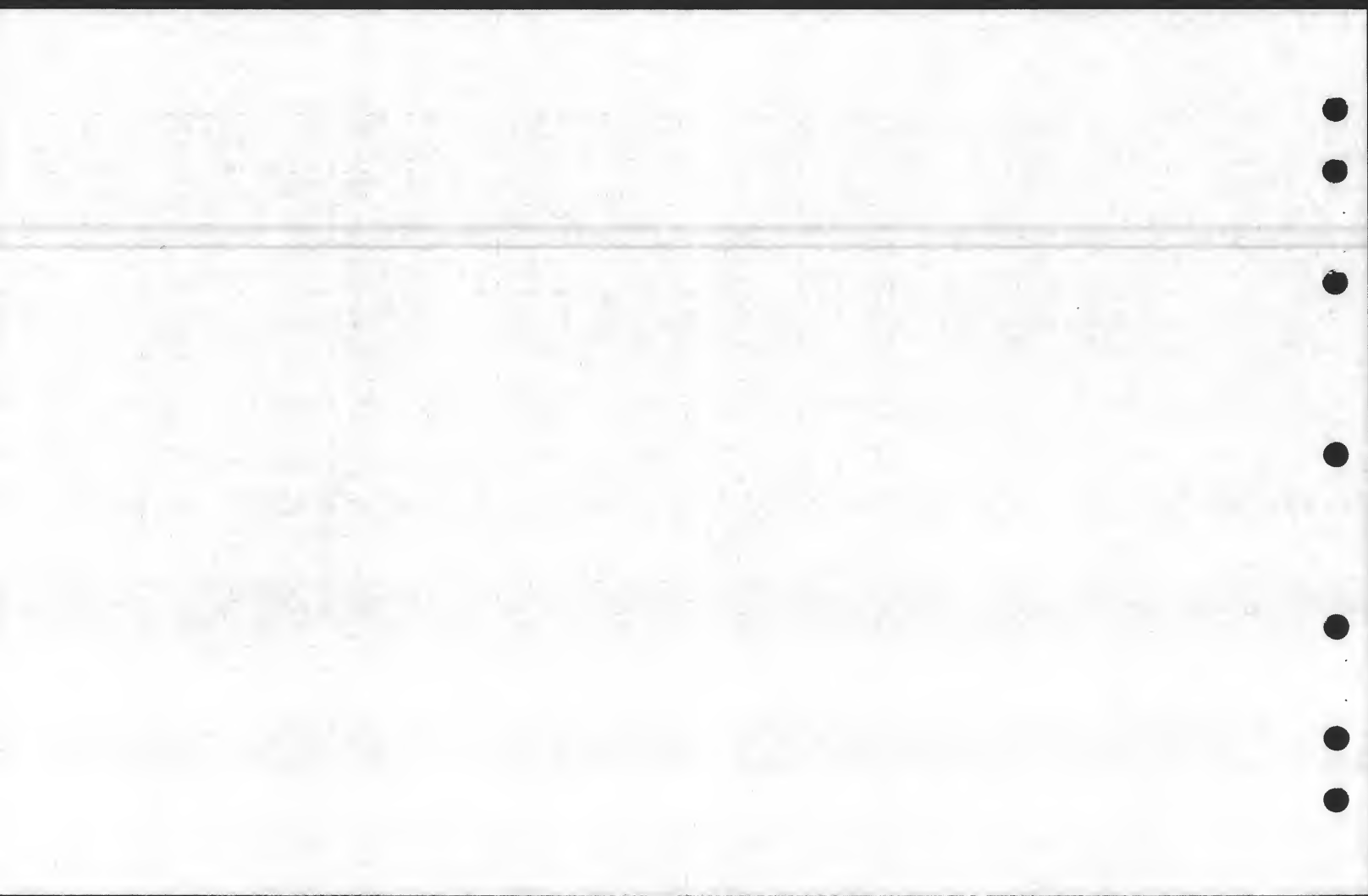
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)				
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6											
							40- TO 56-VOLT SELECTORS																
206G 200H	26A,26D 10E	6	T	Min		56	20	20	20	20	20	20	750	100		50		150	20	0.003 inch	0.003 inch		
				Max	40		40	40	40	40	40	40		400									
			R	Min		56	25	25	25	25	25	25	750	100		50		300	20				
				Max	40		40	40	40	40	40	40	40		400								
206H 200J	26A,26D 10B,10E		T	Min		56	20	20	20	20	20	20	750	100		50		150	20	0.003 inch	0.003 inch		
				Max	40		40	40	40	40	40	40		400									
			R	Min		56	25	25	25	25	25	25	750	100		50		300	20				
				Max	40		40	40	40	40	40	40	40		400								
206J 200K	26D 10E	7	T	Min		56	15	15	15	15	15	15	500	100		45		75		(No Gauge)	0.002 inch		
				Max	40		35	35	35	35	35	35	650	400									
			R	Min		56	20	20	20	20	20	20	20	500	100		50		150				
				Max	40		35	35	35	35	35	35	35	650	400								
206AY	26D		T	Min		56	15	15	15	15	15	15	550	100		75		100		(No Gauge)	0.002 inch		
				Max	40		35	35	35	35	35	35	300										
			R	Min		56	20	20	20	20	20	20	20	550	100		75		200				
				Max	40		35	35	35	35	35	35	35		300								
206BS	26E		T	Min		56	15	15	15	15			550	100		75		100		(No Gauge)	0.002 inch		
				Max	40		35	35	35	35			300										
			R	Min		56	20	20	20	20			550	100		75		200					
				Max	40		35	35	35	35			300										



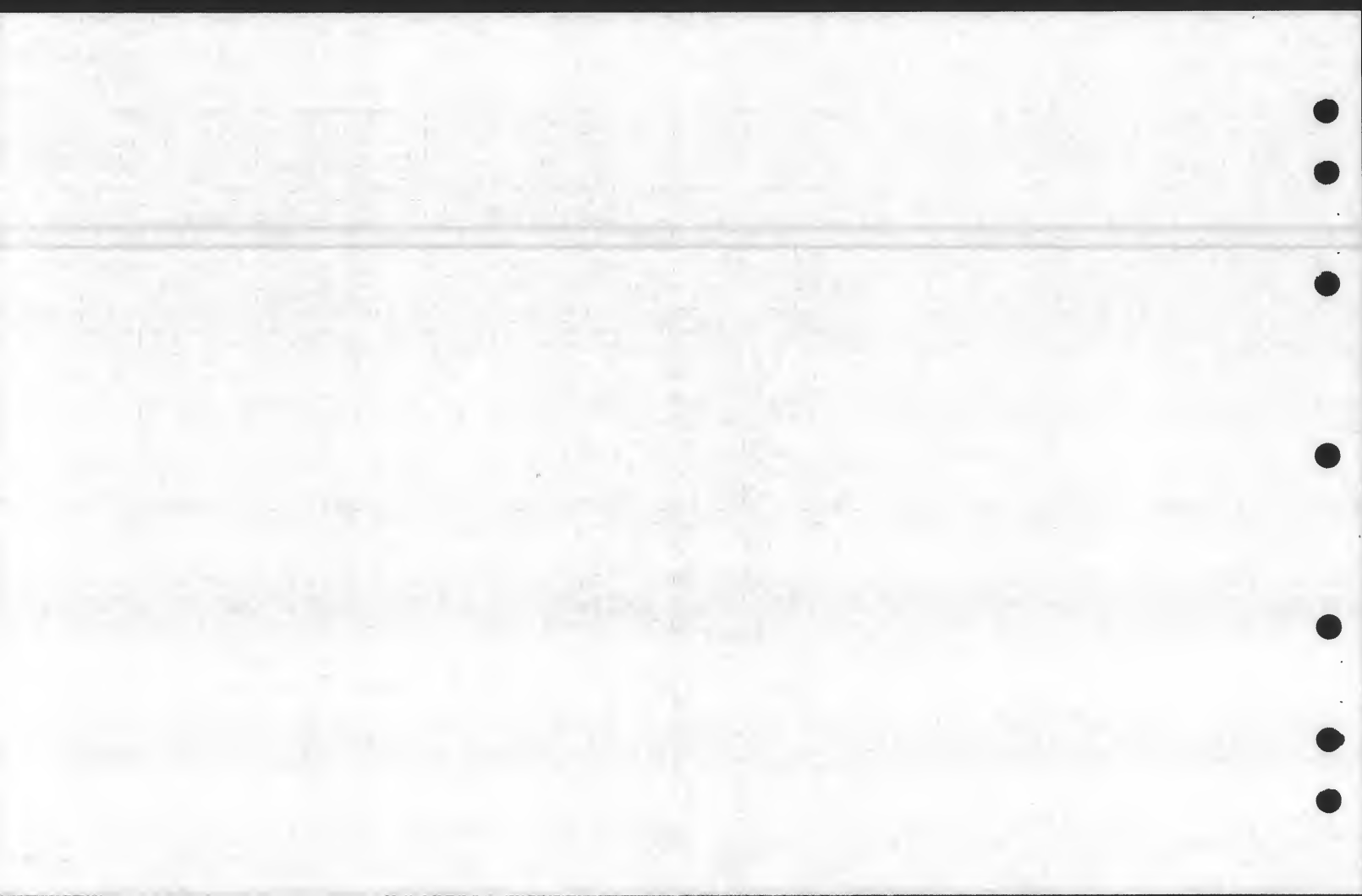
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)				
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6											
206CB	26D			T	Min		56	15	15	15	15	15	15	550	100	75	100	(No Gauge)	0.002 inch				
				Max	40		35	35	35	35	35	35		300									
				R	Min		56	20	20	20	20	20	20	550	100	75	200						
				Max	40		35	35	35	35	35	35	35		300								
206T 200AB	26A 10E			T	Min		44	20	20	20	20	20	20	800	100	50	150	20	(No Gauge)	0.002 inch			
				Max	36		40	40	40	40	40	40	40		400								
				R	Min		45	25	25	25	25	25	25	800	100	50	300	20					
				Max	35		40	40	40	40	40	40	40		400								
206U 200AC	26D 10E			T	Min		44	15	15	15	15	15	15	600	100	50	125	(No Gauge)	0.002 inch				
				Max	36		35	35	35	35	35	35	35	700	300								
				R	Min		45	20	20	20	20	20	20	600	100	50	250						
				Max	35		35	35	35	35	35	35	35	700	300								
206E 200F	26A 10E	S		T	Min		25½	30	20	20	20	20	20	700	100	135	100	30	(No Gauge)	0.002 inch			
				Max	20		50	40	40	40	40	40	40		400								
				R	Min		25½	35	25	25	25	25	25	25	700	100	150	200			30		
				Max	20		50	40	40	40	40	40	40		400								



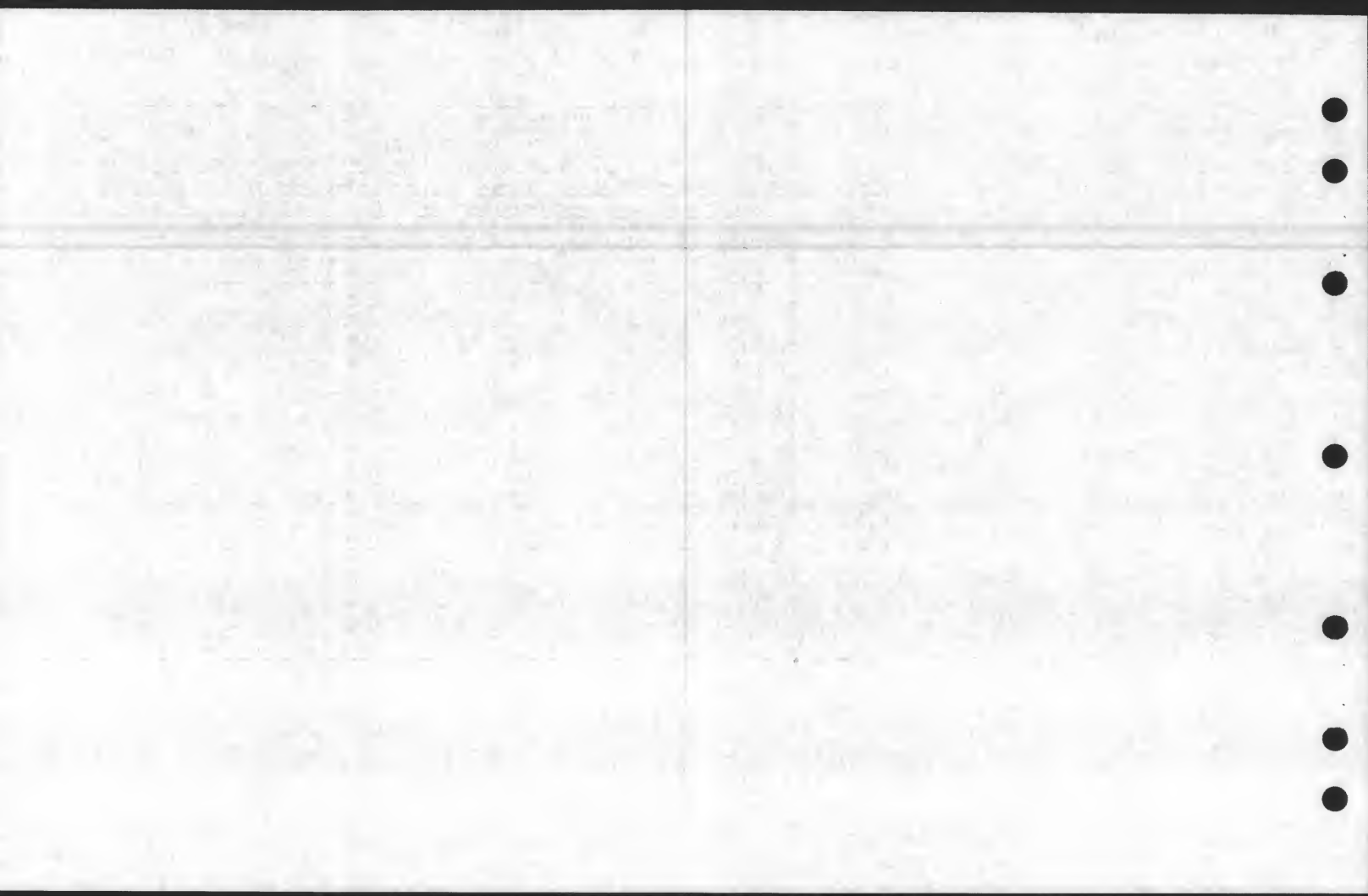
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							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6								
							20- TO 25-VOLT SELECTORS (CONTD)													
206F 200G	26D 10E	9	T	Min		25	30	20	20	20	20	20	700	150	135	100	30	(No Gauge)	0.002 inch	
				Max	20		50	40	40	40	40	40		300						
			R	Min		25	35	25	25	25	25	25	25	700	150	150	200			30
				Max	20		50	40	40	40	40	40	40		300					
206AC 200AJ	26D 10E		T	Min		25½	30	20	20	20	20	20	700	100	135	100	30	(No Gauge)	0.002 inch	
				Max	20		50	40	40	40	40	40		400						
			R	Min		25¼	35	25	25	25	25	25	25	700	100	150	200			30
				Max	20		50	40	40	40	40	40	40		400					
206CF	26A	8	T	Min		25½	30	20	20	20	20	20	800	100	135	100	30	(No Gauge)	0.002 inch	
				Max	20		50	40	40	40	40	40		400						
			R	Min		25¼	35	25	25	25	25	25	25	800	100	150	200			30
				Max	20		50	40	40	40	40	40	40		400					
206CG	26D	9	T	Min		25	30	20	20	20	20	20	800	150	135	100	30	(No Gauge)	0.002 inch	
				Max	20		50	40	40	40	40	40		300						
			R	Min		25	35	25	25	25	25	25	25	800	150	150	200			30
				Max	20		50	40	40	40	40	40	40		300					
206CH	26D		T	Min		25½	30	20	20	20	20	20	800	100	135	100	30	(No Gauge)	0.002 inch	
				Max	20		50	40	40	40	40	40		400						
			R	Min		25¼	35	25	25	25	25	25	25	800	100	150	200			30
				Max	20		50	40	40	40	40	40	40		400					



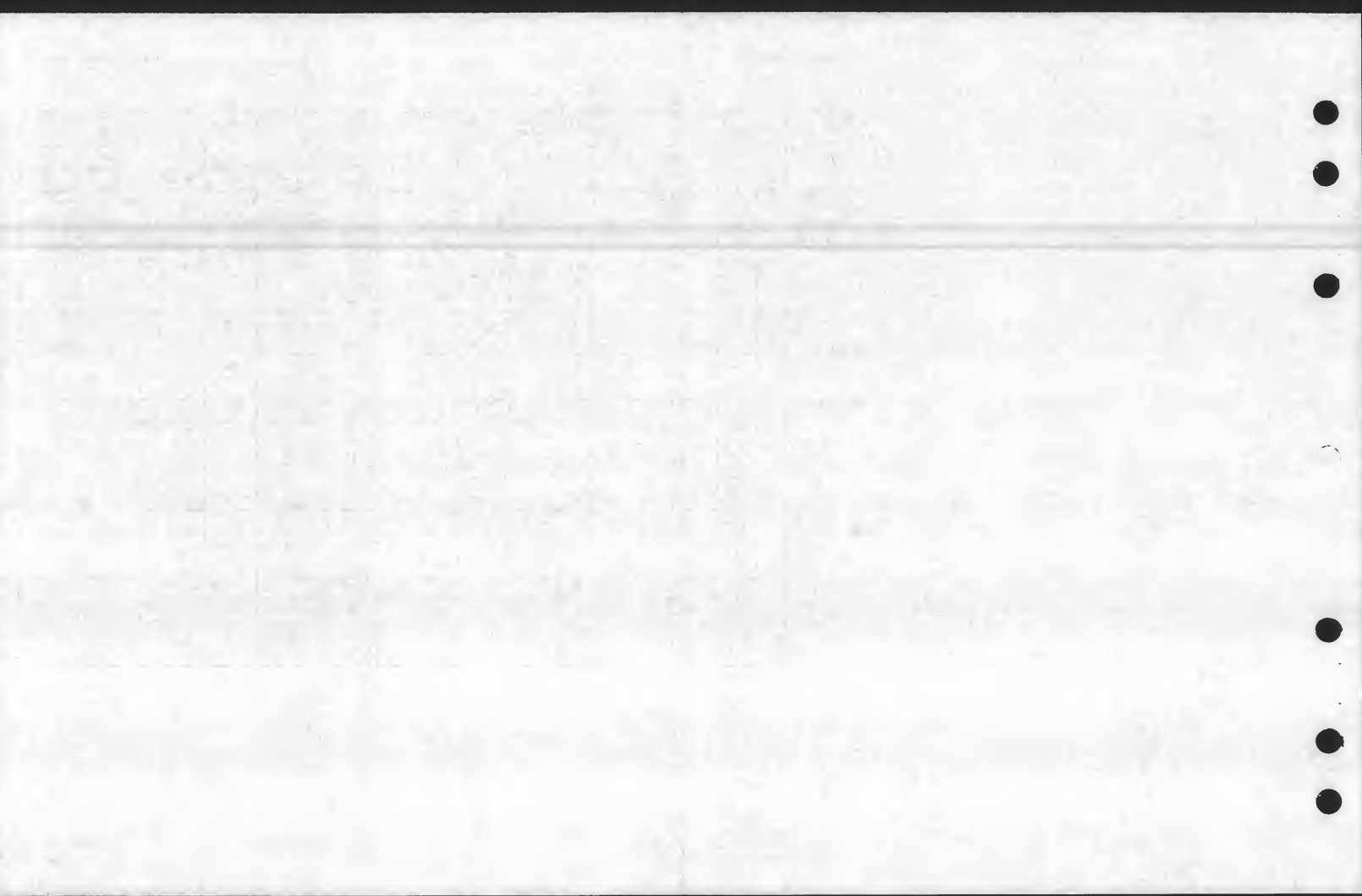
SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)			
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6										
							20- TO 25-VOLT SELECTORS (CONTD)															
D-786S3 D-87398	10L D-78684 28G			T	Min		25	30	25	25			550	100	50	75	(No Gauge)	0.002 inch				
					Max	20		45	40	40			650	400								
				R	Min		26	35	30	30			550	100	50	150						
					Max	19		45	40	40			650	400								
20- TO 28-VOLT SELECTORS																						
206AG 200AP	26E 10F			T	Min		28	30	25	25	25		800	100	50	100	20	0.003 inch	0.003 inch			
					Max	20		50	45	45	45			300								
				R	Min		29	35	30	30	30		800	100	50	200	20					
					Max	19		50	45	45	45			300								
206AH 200AR	26C 10D			T	Min		28	30	30			600	100	150	75	0.003 inch	0.003 inch					
					Max	20		50	50		700	300										
				R	Min		29	35	35	e		600	100	150	150							
					Max	19		50	50			700	300									
206AK 200AU	26D 10E			T	Min		28	15	15	15	15	15	650	200	200	75	0.005 inch	(No Gauge)				
					Max	20		30	30	30	30	30	700	300								
				R	Min		29	20	20	20	20	20	20	650	200	200			150			
					Max	19		35	35	35	35	35	35	700	300							
206AN 200BA	26G 10L			T	Min		30	25	25			800	100	50	150							
					Max	20		50	45	45			300									
				R	Min			35	30	30			800	100	50			300				
					Max	19		50	45	45			300									



SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
							20- TO 28-VOLT SELECTORS (CONT'D)												
206AR 200BC	26E 10F			T	Min	28	20	20	20	30			800	100	50	150	0.003 inch	0.003 inch	
				Max	20	40	40	40	50				300						
				R	Min	29	25	25	25	35			800	100	50	300			
				Max	19	40	40	40	50				300						
206AS 200BD	26A 10B			T	Min	28	30	30	20	20	20	20	800	100	50	150	0.003 inch	0.003 inch	
				Max	20	50	50	40	40	40	40		300						
				R	Min	29	35	35	25	25	25	25	800	100	50	300			
				Max	19	50	50	40	40	40	40		300						
206AT 200BE	26D 10E			T	Min	28	30	20	20	20	20	20	800	100	50	150	0.003 inch	0.003 inch	
				Max	20	50	40	40	40	40	40		300						
				R	Min	29	35	25	25	25	25	25	800	100	50	300			
				Max	19	50	40	40	40	40	40		300						
206BA	26A			T	Min		25	25	25	25	30	30	800	100	50	150			
				Max	20	45	45	45	45	50	50		300						
				R	Min		30	30	30	30	35	35	800	100	50	300			
				Max	19	45	45	45	45	50	50		300						
206BB	26A			T	Min	28	25	25	25	25	25	25	900	100	50	150	0.003 inch	0.003 inch	
				Max	20	45	45	45	45	45	45		300						
				R	Min	29	30	30	30	30	30	30	900	100	50	300			
				Max	19	45	45	45	45	45	45		300						



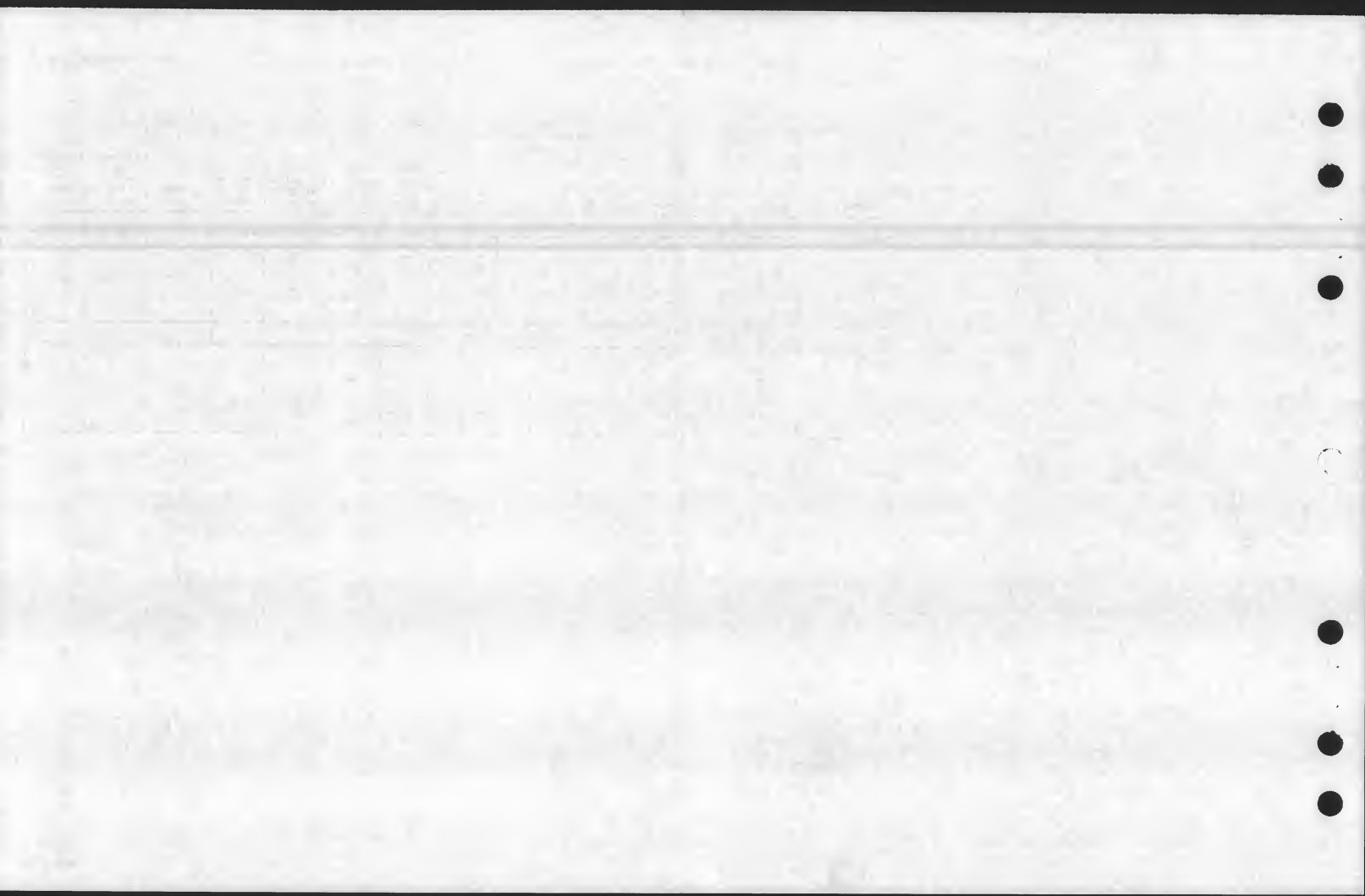
SELECTOR	BANK	SEE NOTE		LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)	
						BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6								
						20- TO 28-VOLT SELECTORS (CONTD)													
206BE	26A		T	Min		25	25	25	25	25	25	900	100	50	150				
				Max	20	45	45	45	45	45	45		300						
			R	Min		30	30	30	30	30	30	900	100	50	300				
				Max	19	45	45	45	45	45	45		300						
206BP	26A,26K		T	Min		30	30	30	30	30	30	800	100	50	150				
				Max	20	50	50	50	50	50	50		300	150					
			R	Min		35	35	35	35	35	35	800	100	50	300				
				Max	19	50	50	50	50	50	50		300	150					
206BG	26D,26J		T	Min	28	30	30	20	20	20	20	900	100	50	150				
				Max	20	50	50	40	40	40	40		300						
			R	Min	29	35	35	25	25	25	25	900	100	50	100			0.003 inch	0.003 inch
				Max	19	50	50	40	40	40	40		300						
206BH	26D,26J		T	Min	28	30	30	20	20	20	20	900	100	50	150				
				Max	20	50	50	40	40	40	40		300						
			R	Min	29	35	35	25	25	25	25	900	100	50	300			0.003 inch	0.003 inch
				Max	19	50	50	40	40	40	40		300						
206BK	26C		T	Min	28	20	20					550	100	50	150				
				Max	20	40	40						300						
			R	Min	29	25	25					550	100	50	200			0.003 inch	0.003 inch
				Max	19	40	40						300						



SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)	
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6								
							20- TO 28-VOLT SELECTORS (CONTD)													
206BM D-81007	26A		T	Min		28	20	20	20	20	20	20	900	100	50	150		0.002 inch	0.002 inch	
				Max	20		40	40	40	40	40	40		300						
				Min		29	25	25	25	25	25	25	900	100	50	300				
				Max	19		40	40	40	40	40	40		300						
206BN	26F		T	Min			30	20	20	20	20		900	100	50	150				
				Max	20		50	40	40	40	40			300						
				Min			35	25	25	25	25	25		900	100	50	300			
				Max	19		50	40	40	40	40			300						
206BT	26G		T	Min		28	30	25	25				800	100	50	150		0.003 inch	0.003 inch	
				Max	20		50	45	45					300						
				Min		29	35	30	30				800	100	50	300				
				Max	19		50	45	45					300						
206BU	26A	10	T	Min		28	30	30	20	20	20	20	800	100	50	150		0.003 inch	0.003 inch	
				Max	20		50	50	40	40	40	40		200						
				Min		29	35	35	25	25	25	25	800	100	50	300				
				Max	19		50	50	40	40	40	40		200						
D-87399	26E		T	Min		28	25	20	20	25			800	100	50	100	20	0.003 inch	0.003 inch	
				Max	20		45	40	40	45				300						
				Min		29	30	25	25	30			800	100	50	200	20			
				Max	19		45	40	40	45				300						



SELECTOR	BANK	SEE NOTE			LOW VOLTAGE	HIGH VOLTAGE	2.23 (ROTOR BRUSH TENSION) (GRAMS)						2.14 (DRIVING SPG TENS.) (GRAMS)	2.31 (TENS. OF OUT. INT SPG)	2.18 (MAGNET PULL TEST) (GRAMS)	2.19 (STEP TEST) (GRAMS)	2.36 (SPEED) (TPS)	2.32 (HIGH- VOLT. INT CONT TEST) (GAUGE)	2.33 (LOW- VOLT. INT CONT TEST) (GAUGE)
							BR NO. 1	BR NO. 2	BR NO. 3	BR NO. 4	BR NO. 5	BR NO. 6							
							20- TO 28-VOLT SELECTORS (CONT'D)												
D-88325	26A	10	T	Min	28	30	30	20	20	20	20	800	100	50	150	0.003 inch	0.003 inch		
				Max	20	50	50	40	40	40	40	200							
			R	Min	29	35	35	25	25	25	25	800	100	50	300				
				Max	19	50	50	40	40	40	40	200							
15- TO 21-VOLT SELECTORS																			
206BJ	26C		T	Min	21	20	20					650	100	100	125	0.003 inch	0.003 inch		
				Max	15	40	40					750	300						
			R	Min	22	25	25					650	100	150	250				
				Max	14	40	40					750	300						



Notes:

1. These requirements shall apply for all uses other than as sender selector and district selector in district and suburban sender selector circuits.
2. These requirements shall apply only when selector is used as sender selector and district selector in district and suburban sender selector circuits.
3. These requirements shall apply only when selector is used in offices where the rated voltage is 45 to 50 volts.
4. These requirements shall apply only when selector is used as a numerical register switch in subscriber sender circuits.
5. These requirements shall apply only when selector is used as a hunting switch in local tandem sender circuits.
6. These requirements shall apply only when selector is used in offices where the rated voltage is 40 to 56 volts.
7. These requirements shall apply for all uses other than as a numerical register switch in subscriber sender circuits and as a hunting switch in local tandem sender circuits.
8. These requirements shall apply only when selector is used in offices where the rated voltage is 20 to 25 volts.
9. (a) The contacts of springs No. 3 and 4 shall make before the contacts of springs No. 1 and 2 break. This requirement may be omitted if springs No. 3 and 4 are not used in the circuit.

(b) The tension of spring No. 3 against its stop, measured approximately 3/64 inch from the free end of the spring, shall be

Min 40 grams, max 60 grams

Use the 79C gauge.

(c) The contact pressure between springs No. 3 and 4, measured when the selector is operated, shall be

Min 50 grams, max 150 grams

Use the 79C gauge.

10. (a) The pressure of spring No. 4 measured at the contact shall be

Min 45 grams, max 65 grams

Use the 79C gauge.

(b) The clearance between the rubber stud and spring No. 4 shall be

Min 0.030 inch, max 0.040 inch

Use the 87B and 112A gauges.

(c) When the armature is operated, the clearance between springs No. 2 and 3 shall be approximately 1/16 inch.

Gauge by eye.

Clamp plate on interrupter-spring pileup is 1/16 inch thick.

11. (a) The tension of spring No. 3 against its stop, measured approximately 3/64 inch from the free end of the spring, shall be

Min 40 grams, max 60 grams

Use the 79C gauge.

(b) The contact pressure on spring No. 4, measured when the selector is operated, shall be

Min 50 grams, max 150 grams

Use the 79C gauge.

12. (a) The pressure of spring No. 3 against the driving arm stud measured just above the stud shall be

Min 30 grams, max 100 grams

Use the 79C gauge.

(b) The separation between the contacts of the No. 2 and 3 springs when the selector is normal shall be

SECTION 026-706-701

Min 0.030 inch, max 0.050 inch

Use the 112A and KS-6938 gauges.

13. While making the high-voltage interrupter contact test (requirement 2.32), a gauge of the value specified below shall be held between the armature and core.

Test—0.003 inch

Readjust—0.004 inch

Use the KS-6909 gauge.

3. APPARATUS

3.01 *List of Tools, Gauges, Materials, and Test Apparatus:*

CODE OR SPEC NO.	DESCRIPTION	TOOLS	DESCRIPTION
		471A	1/4-inch 12-point double-end box wrench
		573A	3/4-inch single-end box wrench
		622A	Selector clamp
		KS-6320	Orange stick
		KS-7782	Parallel-jaw pliers
		KS-8097	7/16- and 5/8-inch 12-point offset box wrench
		KS-14164	Brush
		KS-14250, L1	Flashlight (equipped with two dry cells)
		R-1760	Frame and armature adjuster
		R-2966	Artist brush
243	3/16- and 5/8-inch hex closed double-end flat wrench	AT-7825	3-inch C screwdriver
		AT-7860	B long-nose pliers (2 required)
303	Spring adjuster	GAUGES	
325B	Adjuster (2 required)	70J	0-150 gram gauge
344	Offset screwdriver	74D	Thickness gauge nest (consists of a nest of 75-type gauges)
359	Magnet core and armature cleaning tool	79B	0-1000 gram push-pull tension gauge
363	Spring adjuster (2 required)	79C	0-200 gram push-pull tension gauge
376A	Dental mirror	87B	0.030- and 0.045-inch double-end thickness gauge
379A	Adjuster	92J	0.030-inch nonmagnetic offset thickness gauge
417A	1/4- and 3/8-inch hex open double-end flat wrench	112A	0.040- and 0.050-inch double-end thickness gauge
425A	Selector holder	131A	Thickness gauge nest (consists of a nest of 132-type gauges)
456A	Adjuster	KS-3008	Stopwatch (or equivalent watch with second hand)
485A	Smooth-jaw pliers		
510C	Portable lamp [must be equipped with 561A straight tip and W2CB (24V) or W2BL (48V) cord]		

GAUGES	DESCRIPTION
KS-6909	Thickness gauge nest
KS-6938	Thickness gauge nest
MATERIALS	
KS-7860	Petroleum Spirits
KS-14666	Cloth
KS-16832, L2	Lubricant
—	Hardwood toothpick, flat at one end and pointed at other
—	General Electric Glyptal No. 1201 paint
—	General Electric thinner No. 1500
—	No. 29 aloxite sleeving
—	No. 30 oiled sleeving
—	No. 32 aloxite sleeving
—	No. 33 oiled sleeving
TEST APPARATUS	
32A	Test set
J94706	200- and 206-type selector test sets per SD-90013-01
1W13B	Cord (2 required)
—	Battery control test set (wagon type) for testing 200- and 206-type selectors in panel offices
—	Portable test set for testing 200- and 206-type selectors in key indicator and step-by-step call indicator offices

3.02 Use of 425A Selector Holder and 622A Selector Clamp:

In general, when making adjustments on selectors which are nonrigidly mounted, which necessitates placing an excessive strain on the mounting, such as in adjusting the driving spring lug for requirement 2.14 (Driving Spring Tension), use the 425A selector holder on flat-type mounting plates or the 622A selector clamp

on channel-type mounting plates to hold the selector by putting the selector holder in place as shown in Fig. 23 or 24 and tightening the thumbscrew.

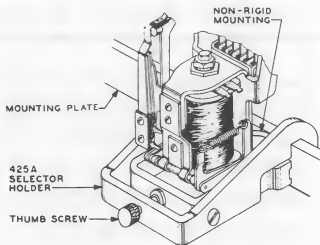


Fig. 23—425 Selector Holder in Place on Nonrigidly Mounted Selector on Flat-Type Mounting Plate

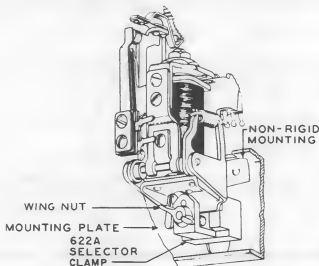


Fig. 24—622A Selector Clamp in Place on Nonrigidly Mounted Selector on Channel-Type Mounting Plate

4. ADJUSTING PROCEDURES

4.01 Cleaning: (Req't 2.01)

(a) **Ratchet Wheel and Armature Bearing:**

If there is an accumulation of gummy oil or foreign matter on the ratchet wheel or armature bearings, apply KS-7860 petroleum spirits very sparingly with the KS-14164 brush to soften this matter. Take care to keep the petroleum spirits from coming in contact with the spoolheads of the magnet or with any part of the bank or rotor brush assemblies. Use a clean, dry KS-14666 cloth to remove this matter from the armature bearings and from the teeth and sides of the ratchet wheel. Wipe off any accumulation of old lubricant below the overthrow stop. Then lubricate parts as covered in paragraph 4.03.

(b) **Magnet Core Gap:** Insert the 359 cleaning tool between the armature and the core and apply sufficient pressure to the bottom of the armature to force it upward against the cleaning tool as shown in Fig. 25. Then forcibly withdraw the cleaning tool. Repeat this operation several times, using first one flat surface of the tool and then the other, to remove dust and loose galvanizing scales that may have accumulated between the armature and the core.

Note: If a new 359 cleaning tool is to be used, check whether the tool is covered with a protective film of oil. If this condition exists, remove the film with KS-7860 petroleum spirits applied on a KS-14666 cloth.

(c) **Interrupter Contacts:** Clean the interrupter contacts as covered in Section 069-306-801.

4.02 Treatment of Banks and Rotors:

(Reqt 2.02)—If necessary, clean and treat the rotor and bank terminals as covered in Section 069-330-801.

4.03 Lubrication: (Reqt 2.03)

- (1) Make sure the container of KS-16832, L2, lubricant has been shaken as covered in paragraph 1.05.
- (2) Before applying lubricant, clean and remove accumulations from the selector parts as covered in subparagraph 4.01(a).
- (3) **Rotor Bearings:** Shift the rotor on the shaft to take up the endplay of the rotor

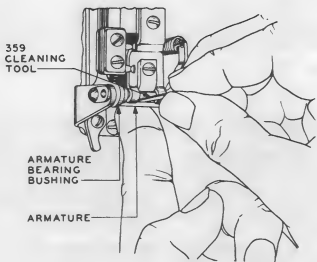


Fig. 25—Method of Cleaning Adjacent Surfaces of Magnet Core and Armature

toward one side of the selector, and apply the specified quantity of lubricant through the hole in the side of the frame. Press the rotor from side to side a few times to aid the lubricant in reaching the bearing surfaces. On selectors not provided with this hole, apply the lubricant as shown in Fig. 26. Take up the endplay of the rotor in the opposite direction and similarly apply the specified quantity of lubricant to the other bearing.

- (4) **Armature Bearings:** Apply the specified quantity of lubricant to each side of each bearing.
- (5) **All Bearings:** After lubricant has been applied, rotate the selector several revolutions under self-interruptions or step by step, depending upon the wiring arrangement of the selector circuit, in order to distribute the lubricant more evenly over the bearings.

Surfaces of Ratchet Wheel Teeth

- (6) Apply the specified quantity of lubricant to the surfaces of the ratchet wheel teeth just below the retaining pawl while the selector is rotating. Exercise care in applying the lubricant to prevent its getting on the rotor brushes.

- (7) **Overthrow Stop:** Electrically energize the selector, and apply the specified quantity of lubricant to the overthrow stop.

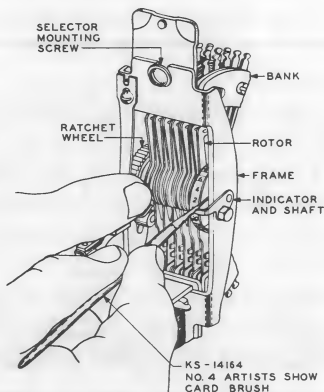


Fig. 26—Method of Lubricating Rotor Bearing When Lubricating Hole Is Not Provided

- 4.04 **Record of Lubrication:** (Reqt 2.04)—(No Procedure)

- 4.05 **Alignment of Tips and Rotor Brushes:** (Reqt 2.05)—If the requirement is not met, the indications are that the rotor brushes are loose in the assembly. In this case, replace the rotor brush assembly with a new one as covered in Section 026-706-801.

- 4.06 **Clearance Between No. 1 Rotor Brush and Driving Arm:** (Reqt 2.06)—If the No. 1 rotor brush meets requirement 2.20 (Rotor Brush Alignment), failure to meet requirement 2.28 is probably due to a bent driving arm. Adjust the driving arm with the R-1760 adjuster applied to the driving arm directly beneath the point where the pawl spring is attached to the driving arm. After adjusting the driving arm, make sure that

the end of the driving pawl will strike the overthrow stop squarely.

- 4.07 **Armature Bearing Pin Position (Armature Bearing Pin Without Clamp Plate):** (Reqt 2.07)—If the requirement is not met, reposition the armature bearing pin as follows. Referring to Fig. 1 remove the frame stiffening bracket mounting screw nearer the rotor brush assembly and slightly loosen the other mounting screw using the 3-inch C screwdriver. Swing the interrupter spring assembly to gain access to the bracket clamp mounting screw, and temporarily tighten the stiffening bracket mounting screw. Loosen the bracket clamp mounting screw, and position the armature bearing pin as required. Position the bracket clamp against the pin, and securely tighten the bracket clamp mounting screw. Reposition the interrupter spring assembly, and securely tighten the stiffening bracket mounting screws.

- 4.08 **Armature Endplay:** (Reqt 2.08)

- 4.09 **Clearance Between Rear Corners of Armature and Lugs of the Frame:** (Reqt 2.09)—If the armature endplay is not satisfactory or if there is insufficient clearance between either rear corner of the armature and a lug of the frame, proceed as follows.

Armature Endplay

- (a) **200-, 206-, and 211-Type Selectors:**

Before adjusting a lug to correct for unsatisfactory endplay, check the clearance between the rear corners of the armature and the frame lugs as follows. Move the armature to one side until the armature bushing touches the lug. Using the 376A dental mirror, note the clearance between the rear corner and the lug at that side. If the clearance is approximately the same at both corners, adjust both lugs equally. If, however, one clearance is greater than the other, adjust the lug on the side having the greater clearance. To do this, place the R-1760 adjuster on the lug as far back as possible and bend the lug outward. After making this adjustment, check that the clearance as covered by requirement 2.09 is met.

- (b) **209-Type Selectors:** Proceed as covered in (a) to check the clearance at the rear corners and to determine the lug to be adjusted.

- (1) Before adjusting the lug
 - Remove the driving spring from the driving spring arm with the B long-nose pliers and remove the frame stiffening bracket mounting screws with the 3-inch C screwdriver.
 - Remove the frame stiffening bracket and spring assembly. Allow the contact spring assembly to hang by the wires, taking care that the wires are not broken off.
 - Remove the armature bearing pin clamp mounting screw with the 3-inch C screwdriver and remove the bearing pin and clamp.
- (2) If the mounting of adjacent apparatus does not permit the removal of these parts
 - Loosen the selector mounting screw at the top and remove the mounting screw at the bottom with the 3-inch C screwdriver.
- (3) Tilt the selector outward from the bottom so the parts may be removed.
- (4) Remove the armature and pawl assembly.
- (5) Adjust the lug to be adjusted as covered in (a).
- (6) Then reassemble the parts that were removed as follows:
 - Remount the armature and pawl assembly, taking care that the pawl is between the ratchet wheel and overthrow stop.
 - Insert the bearing pin and insert and securely tighten the armature bearing clamp mounting screw.
 - Remount the spring assembly and frame stiffening bracket.
 - Insert and securely tighten the mounting screws.
 - Mount the driving spring in place on the driving spring arm.
 - Insert the lower mounting screw of the selector, and securely tighten this screw

and the mounting screw at the top of the selector.

- (7) After reassembling the parts

- Recheck the clearance as covered above.
- Make sure that armature endplay is satisfactory and that other requirements are satisfactorily met.

Clearance Between Rear Corners of Armature and Lugs of the Frame

(c) 200-, 206-, and 211-Type Selectors:

To increase the clearance between a rear corner and the adjacent lug, adjust inwardly the lug on the side with insufficient clearance using the R-1760 adjuster as covered in (a). Adjusting the lug in this manner will reduce the armature endplay. If the endplay is less than 0.010 inch, adjust the opposite lug outwardly and recheck for clearance.

(d) 209-Type Selectors: Proceed as covered in (c) after disassembling parts as covered in (b). After making the necessary adjustments, reassemble the parts and then recheck for endplay and clearance.

4.10 Armature Backstop Position: (Req

2.10)—If the armature backstop is incorrectly mounted on the selector, remove the mounting screw using the 3-inch C screwdriver and remount the backstop correctly. Then check that requirements 2.11 through 2.15 are met.

4.11 Position of Rotor Brushes on Bank Terminals: (Req 2.11)

4.12 Overthrow Stop Position: (Req 2.12)

General

- (1) The extreme backward position of the rotor brushes on the bank terminal is determined by the retaining pawl, and the extreme forward position is determined by the armature backstop. A slight clearance is needed between the forward stop and the driving pawl to meet requirement 2.12. When an adjustment is made to meet any of these requirements, the other requirements should be checked and adjustments made if necessary.

Note: The overthrow stop does not determine the forward position if there is clearance between it and the driving pawl, as there should be; the forward position is determined by the armature backstop (except for high-speed, dynamic overthrow). The retaining pawl position determines the backward position.

(2) To change the position of the rotor brushes with respect to the leading edge of their respective terminals, adjust the position of the armature backstop as follows. For a slight change in the position of the armature backstop, tap the bottom of the backstop with the R-1760 adjuster to move it in the required direction. If considerable movement of the backstop is required, loosen the backstop mounting screw slightly with the 3-inch C screwdriver and reposition the backstop. Tighten the mounting screw securely, and recheck the requirement.

(3) If the back and forth motion of the rotor brush assembly or the position of the overthrow stop is unsatisfactory, reposition the overthrow stop as follows. Loosen the overthrow stop mounting screw with the 417A wrench. Reposition the overthrow stop as required. Tighten the mounting screw securely, and recheck the requirement.

4.13 **Retaining Pawl Position and Tension:** (Req't 2.13)

(1) Adjust the retaining pawl position by slightly loosening the retaining pawl mounting screw with the 3-inch C screwdriver and moving the pawl up or down as required. Tighten the mounting screw. Make sure that the end of the pawl falls wholly within the face of the ratchet wheel.

(2) Adjust the retaining pawl tension by applying the 303 adjuster to the base of the pawl as near as possible to the point where the pawl is fastened to the selector frame, and then recheck the retaining pawl position.

4.14 Driving Spring Tension: (Req't 2.14)—Adjust the driving spring lug on the selector frame with the 379A adjuster. (Do not adjust the driving spring arm.) Exercise care in adjusting this lug, as it is possible to spring the whole selector frame, thereby affecting many of the other adjustments. Also take care not to throw

the lug out of alignment with the arm on the armature to which the other end of the driving spring is attached and thus cause unnecessary friction in the armature bearings. Make sure that requirements 2.18 (Magnet Pull Test) and 2.19 (Step Test) are met.

4.15 Armature Airgap: (Req't 2.15)—To adjust the armature airgap, proceed as follows.

(1) Loosen the magnet clamping screw with the 541A wrench where the screw has a hexagonal head; otherwise, use the 344 offset screwdriver.

(2) Loosen the magnet adjusting locknut with the 573A wrench (209-type selectors).

(3) Adjust the airgap as required by moving the magnet adjusting bushing up or down with the KS-8097 wrench.

(4) Hold the bushing with the KS-8097 wrench, and then tighten the locknut with the 243 or 573A wrench as required.

(5) Retighten the magnet clamping screw.

(6) Recheck the adjustment. Repeat the operation, if necessary, until the required adjustment is obtained.

After tightening the magnet, make sure there is clearance between the magnet spoolhead and driving arm. Make sure requirements 2.18 (Magnet Pull Test), 2.36 (Speed), 2.32 (High-Voltage Interrupter Contact Test), and 2.33 (Low-Voltage Interrupter Contact Test) are met.

4.16 **Driving Pawl Tension and Position:** (Req't 2.16)

Driving Pawl Tension

(1) Adjust the driving pawl tension by applying one 325B adjuster to the sloping portion of the driving pawl adjacent to the reed spring as shown in Fig. 27. Apply another 325B adjuster to the approximate center of the horizontal section of the driving pawl. Adjust the horizontal section of the driving pawl upward to increase the tension and downward to decrease the tension. Adjust the driving pawl until the required tension is obtained. Recheck requirements 2.10 (Armature

Backstop Position) and 2.12 (Overthrow Stop Position).

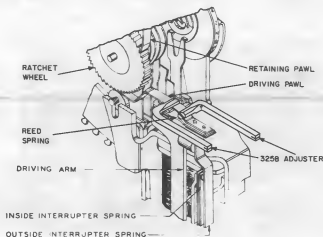


Fig. 27—Method of Adjusting Driving Pawl Tension

Driving Pawl Position

(2) If the sides of the driving pawl along its length are not parallel with the sides of the ratchet wheel or if the tip end of the driving pawl extends beyond either edge of the ratchet wheel, apply the R-1760 adjuster to the driving arm beneath the point where the pawl spring is attached to the driving arm and adjust the driving arm so this part of the requirement is met.

(3) If the driving edge of the pawl is not parallel with the bottom of the tooth, hold the driving pawl and the pawl spring at the rivets with a pair of B long-nose pliers and apply another pair of B long-nose pliers to the horizontal portion of the pawl spring and adjust this portion with a rotary motion of the pliers.

4.17 Pawl Guide Position, 209-Type Selectors: (Reqt 2.17)—To adjust the position of the pawl guide, move the rotor until the brushes are out of the way and then bend the guide, as required, with the 485A pliers.

4.18 Magnet Pull Test: (Reqt 2.18)—If the requirement is not met, it indicates that either the armature airgap is too large or the spring tension is too high, in which case adjust

the driving spring tension as covered in paragraph 4.14 or the armature airgap as covered in paragraph 4.15.

4.19 Step Test: (Reqt 2.19)

- (1) Failure to meet this test is an indication that the driving spring tension is too close to the specified minimum or that the brush load is excessive.
- (2) When necessary, check and readjust for paragraph 4.23 (Rotor Brush Tension) and paragraph 4.14 (Driving Spring Tension).

4.20 Rotor Brush Alignment: (Reqt 2.20)

4.21 Feeder Brush Position: (Reqt 2.21)

4.22 Feeder Brush Tension: (Reqt 2.22)

4.23 Rotor Brush Tension: (Reqt 2.23)

4.24 Rotor Brush Prong Contact: (Reqt 2.24)

Rotor Brush Alignment

- (1) In case the majority of the rotor brushes is found to be out of alignment in the same direction with respect to the bank feeder brushes or bank terminals, loosen the selector mounting screws with the 3-inch C screwdriver and shift the selector to the right or left, as required, and then retighten the screws.
- (2) Adjust an individual rotor brush spring, as required, with the 363 adjuster. Exercise care not to produce any sharp bends or kinks or otherwise distort the brushes.
- (3) Advance the rotor brush assembly electrically for a half revolution, or until the opposite ends of the rotor brushes are about to pass onto the bank feeder brushes or bank terminals, and repeat the above adjustment.

Feeder Brush Position

- (4) Adjust the feeder brushes, as required, with the 363 adjuster or with the KS-7782 parallel-jaw pliers.
- (5) In the case of detachable feeder brushes, it may be necessary to loosen the detachable

feeder brush unit mounting nut with the 417A wrench and shift the unit, making use of play in the mounting hole. If this does not permit the required adjustment, remove the detachable feeder brush assembly from the mounting stud and change the number of spacing washers as required.

Feeder Brush Tension

(6) *Single-Piece-Type Feeder Brushes per Fig. 12, 13, 14, (Balanced Type):*

If necessary to adjust the brush, apply the 363 adjuster to the front prong just above the crotch and adjust as required. In case the rear prong does not make contact with the rotor brush hub, insert the 456A adjuster between the feeder brushes and adjust the rear prong; then recheck the tension of the front prong. Make an effort to have the pressure of the two prongs approximately equal. This may be accomplished if the feeder brush is kept free of bows or kinks.

(7) *Single-Piece-Type Feeder Brushes per Fig. 15:*

Place the 363 adjuster close to the base of the brush and apply a turning motion, taking care not to distort the brush. Make sure that the part of the bank feeder brush over which the rotor brush passes is not out of alignment with the first row of bank terminals by more than the specified amount and, if necessary, readjust with the KS-7782 pliers by grasping the brush above the point at which the rotor brushes make contact. Move the pliers toward the top, at the same time giving them a twisting motion in the direction of the desired tension.

(8) *Two-Piece-Type Feeder Brushes per Fig. 16:*

Place the 363 adjuster on one of the individual springs of the feeder brush to be positioned as near the base of the spring as possible and, with an upward wiping motion of the adjuster, tension the spring in the proper direction. Repeat for the other spring of the feeder brush.

Rotor Brush Tension

(9) To adjust an individual rotor brush spring, apply the 363 adjuster to the base of the brush spring close to the shaft of the rotor brush assembly. In the case of detachable feeder brushes, it may be necessary to advance the

selector one or two steps to adjust the springs close to the shaft of the rotor brush assembly; then restore the rotor brush assembly to its previous position to check the adjustment. Take care in adjusting the brush springs not to change the alignment of the brush contact edges. This is especially important in bridging brushes where such improper adjusting would shorten the contact surfaces. Also, take care in meeting this requirement to hold the tension of each brush as close as possible to the minimum pressure specified in order that the friction of the brush load will not prevent the selector from meeting requirements 2.19 (Step Test), 2.36 (Speed), 2.32 (High-Voltage Interrupter Contact Test), and 2.33 (Low-Voltage Interrupter Contact Test). In making adjustments of brush spring tensions, give the adjuster a turning motion, not a side motion.

(10) When adjustments have been completed on one brush end of the rotor brush assembly, step the selector electrically (step by step) to a position where the opposite brush end is in the proper position and make the necessary readjustments as covered in (9).

(11) *Rotor Brush Prong Contact:* Set the rotor brush assembly approximately in a horizontal position. Apply a 363 adjuster near the base of the prongs to hold the brush steady and adjust the outer prongs, as required, with another 363 adjuster and the inner prongs with the 456A adjuster. Make an effort to adjust the prongs of the individual brush member so that prongs contact the feeder brush.

4.25 Toeing of Bridging Brushes: (Req 2.25)—Set the rotor brush assembly approximately in a horizontal position. Then hold the heel of the brush with one 363 adjuster, and use a second 363 adjuster on the contact portion of the brush to produce the required toeing out. Take care not to distort the brush when applying this adjustment.

4.26 Heel Spacing: (Req 2.26)

4.27 Endplay: (Req 2.27)

4.28 False Contacting: (Req 2.28)

(1) Step the selector electrically to each of the specified positions.

(2) Adjust the brushes close to the heels, as required, with the 363 adjuster. When detachable feeder brushes are installed, it will be necessary to advance the selector beyond these brushes to adjust the springs; then return the rotor assembly to its previous position, and recheck the adjustment. Recheck requirements 2.20 (Rotor Brush Alignment), 2.23 (Rotor Brush Tension), and 2.25 (Toeing of Bridging Brushes).

4.29 Contact Alignment: (Reqt 2.29)—If the contacts do not line up properly, slightly loosen the spring pileup screws with the 3-inch C screwdriver, adjust the position of the contact springs, and then securely tighten the pileup screws.

4.30 Position of Inside Interrupter Spring (Spring No. 1): (Reqt 2.30)—To adjust the inside interrupter spring (spring No. 1), loosen the spring assembly screws with the 3-inch C screwdriver sufficiently to permit the application of the 303 adjuster as near the base of the spring as possible. Adjust the spring, as required, taking care not to damage the insulator. Tighten the screws securely, taking care that the long insulator is lined up with the interrupter spring and that the contact point falls wholly within the boundary of the opposing contact.

4.31 Tension of the Outside Interrupter Spring (Spring No. 2): (Reqt 2.31)—Readjust the tension of the outside interrupter spring with the 303 adjuster applied close to the base of the spring.

4.32 High-Voltage Interrupter Contact Test: (Reqt 2.32)

4.33 Low-Voltage Interrupter Contact Test: (Reqt 2.33)

4.34 Interrupter Contact Break—209A Selector: (Reqt 2.34)

4.35 Clearance Between Driving Arm Stud and Interrupter Spring: (Reqt 2.35)

(1) When a considerable amount of adjusting is required, adjust the spring stop with the 379A adjuster, but, when a slight adjustment is required, adjust the interrupter spring with the 303 adjuster. To use the 379A adjuster, apply

it to the spring stop from the side nearest the magnet coil, as shown in Fig. 28, and adjust the spring stop as required. In making this adjustment, exercise care to keep from throwing the lip perceptibly out of parallel with the face of the driving arm stud.

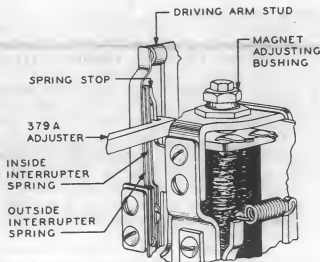


Fig. 28—Method of Adjusting Spring Stop

(2) When adjusting the spring stop, attempt to obtain the correct adjustment with the least number of adjusting operations because the spring stop has a tendency to lose its adjustment if it is subjected to too many adjusting operations.

Warning: The position of the interrupter spring will be affected when the outside spring is adjusted as specified in (1) and (2) above. Do not attempt to readjust the interrupter spring, but make sure that it rests flat against its insulator.

4.36 Speed: (Reqt 2.36)

4.37 Variable Requirements: (Reqt 2.37)—Adjust the parts having variable requirements listed in the charts furnished with the section in accordance with the prescribed procedures.